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CONTENTS OF VOLUME XXVIII.

NUMBER 1.

PAGE

1. Extirpation of the Lachrymal Sac and Gland. By Dr. **C. R. Holmes,** Cincinnati, O. (With 12 illustrations, on Text-Plates I.–VI., of cases and dissections. Also reports of 17 operations) . 1

2. Declination of the Vertical Meridians of the Retina. By **George T. Stevens,** M.D., Ph.D., New York 24

3. Experiments on the Germicide Properties of Certain Eye Salves. By **Rosa Welt Straus,** M.D., Brooklyn 40

4. Holocain in Ophthalmic Surgery; Its Superiority over Cocaine; Its Therapeutic Value. By **Hasket Derby,** M.D., Boston . . 45

5. A Case of Extensive Chronic Empyema of the Frontal and Ethmoidal Sinuses with Exophthalmos; Operation; Recovery. By **Arnold H. Knapp,** M.D. (With a figure on Text-Plate VII.) . 50

6. The Pathological Anatomy of Polypoid Tumors of the Conjunctiva. By Dr. **Ischreyt.** Translated by Dr. COLMAN W. CUTLER, New York. (With a lithographic plate Taf. III. of Vol. XXXII. of German edition) 55

7. Abstracts of Articles, not Previously Translated, in Vol. XXXII. (1896) of the *Archiv für Augenheilkunde.* By Dr. **Colman W. Cutler,** New York 58

IV.—The Etiology and Treatment of Certain Forms of Conjunctivitis Pseudo-Membranosa. By Dr. Orlando Pes, 58.

VIII.—Experiments on the Action of Subconjunctival Injection of Salt Solutions, upon Absorption from the Anterior Chamber and the Vitreous. By Dr. Carl Mellinger, Basel, 60.

IX.—The Cortical Pupillary Reflex of Haab in its Relation to the Hemiopic Pupillary Reaction. By Dr. Heddaeus, Essen a. d. Ruhr, 61.

X.—Partial, Isolated Paresis of the Orbicularis Palpebrarum. By Dr. P. Silex, Berlin, 62.

XI.—A Consideration of Dr. Ahlström's Article on the Antiseptic Action of the Tears. By Dr. Ludwig Bach, Würzburg, 64.

XVI.—Tuberculosis of the Cornea. By Dr. Ludwig Bach, Würzburg, 64.

XVIII.—The Relations between Disturbances of Orientation and Unilateral and Bilateral Hemianopsia. By Dr. A. Peters, Bonn, 66.

PAGE

XXII.—A Comparative Investigation of Certain Therapeutic Measures Associated with Leucocytosis in the Staphylococcus Ulcer of the Cornea. By Dr. Otto von Sicherer, 70.

XXIII.—A Contribution to the Study of Epidemic Night-Blindness. By Dr. Schtschepotzew, in Kiew, Russia, 72.

XXVI.—Historical Remarks on the Anatomy of the Ora Serrata. By Dr. E. Berger, Paris, 73.

XXVII.—A Case of Unilateral Loss of the Pupillary Light-Reflex. By Dr. L. Caspar, Mülheim-a.-Rh., 73.

XXVIII.—Adenoma of the Ciliary Body as Cause of Glaucoma. By Dr. Ed. Pergens, Brussels, 74.

XXIX.—Sarcoma of the Iris. By Dr. F. Werther, Warsaw, 75.

8. Systematic Report on the Progress of Ophthalmology in the Second Quarter of the Year 1898. By Dr. **St. Bernheimer,** etc. Translated by Dr. WARD A. HOLDEN 77

A.—Dr. C. HORSTMANN. General ophthalmological literature, 77; General pathology, diagnosis, and therapeutics, 79; Instruments and remedies, 80.

B.—Dr. ST. BERNHEIMER. Anatomy, 84; Physiology, 85; Refraction and accommodation, 86; Muscles and nerves, 87.

C.—Dr. P. SILEX. Lids, 89; Orbit and neighboring cavities, 90; Conjunctiva, 92; Cornea, sclera, and anterior chamber, 95.

D.—Dr. O. BRECHT. Lens, 98; Iris, 99; Choroid, 100; Vitreous, 101; Glaucoma, 102; Sympathetic ophthalmia, 104.

E.—Dr. R. GREEFF. Retina and functional disturbances, 104; Optic nerve, 106; Injuries, foreign bodies, parasites, 107; Ocular disturbances in general diseases; 108.

9. Report of the Transactions of the Section on Ophthalmology and Otology of the New York Academy of Medicine. By Dr. **W. B. Marple,** Secretary 112

10. **Book Notices** 116

I.—Report on the Ophthalmic State of the Poor-Law Children in the Metropolis. By Sydney Stephenson, Esq., M.B.

II.—Gesichtsstörungen und Uterinleiden. Von Prof. Dr. A. Mooren.

III.—Das Sideroscop u. seine Anwendung. Von Dr. Eduard Asmus.

IV.—Über der Verwertbarkeit der Bindehaut in der practischen u. operativen Augenheilkunde. (On the Use of the Conjunctiva in Eye-Surgery.) Von Dr. Hermann Kuhnt.

V.—Über den künstlichen Hornhautersatz. (The Artificial Restitution of the Cornea.) By Fritz Salzer.

VI.—The Ophthalmoscope. A Manual for Students. By Gustavus Hartridge.

VII.—Traité d'Ophtalmoscopie. By Etienne Rollet.

VIII.—Atlas der äusseren Erkrankungen des Auges, nebst Grundriss ihrer Pathologie und Therapie. By Prof. O. Haab.

IX.—Atlas of External Diseases of the Eye. By A. Maitland Ramsay, M.D.

X.—Handeling by het Oogheelkundig Onderzoek. (Technique of Ophthalmic Examination.) By Dr. H. Snellen, Jr.

XI.—Oogheikundige Verslagen en Bydragen, uitgegeven met het Jaarverslag van het Nederlandsch Gasthuis voor Ooglyders, No. 39.

XII.—Anleitung zur microscopischen Untersuchung des Auges. By Prof. R. Greeff.

XIII.—Pathologie des Auges. By Th. Axenfeld and A. E. Fick.

XIV.—Ophtalmologie du xii Congrès international de médecine de Moscou.

XV.—Die Neurologie des Auges. Ein Handbuch für Nerven- und Augenärzte. By D. H. Wilbrand.

XVI.—Diseases of the Eye. A Handbook of Ophthalmic Practice for Students and Practitioners. By G. E. De Schweinitz.

XVII.—The Crystalline Lens System. By Louis Stricker, M.D.

NUMBER 2.

PAGE

1. The Pathology of the Amblyopia Following Profuse Hemorrhage and of that Following the Ingestion of Methyl Alcohol, with Remarks on the Pathogenesis of Optic-Nerve Atrophy in General. By Dr. **Ward A. Holden**, New York. (With two figures on Text-Plate VIII.) 125

2. The Introduction of Iodoform into the Anterior Chamber of the Eye in Tuberculous Iritis. By **N. J. Weill**, M.D. 135

3. A Case of Melano-Sarcoma of the Choroid. By **Matthias Lanckton Foster**, M.D., of New York 146

4. Electro-Magnets for Use with the 110-Volt Direct-Current Lighting Circuit. By **A. B. Kibbe**, M.D., Seattle, Washington . . 148

5. Clinical Contributions. The Bicycle as a Cure for Exophoria—Papillitis Observed in the Process of its Development—Aniridia Traumatica—Traumatic Partial Paralysis of the Oculo-Motor Nerve—Two Cases of Extraction of a Piece of Steel from the Eye by the Giant Electro-Magnet. By Dr. **Kaspar Pischel**, San Francisco, Cal. 153

6. Clinical Observations on a Case of Partial Incomplete Coloboma of the Iris. By Dr. **Arthur Gloor.** Translated and Abridged by MATTHIAS LANCKTON FOSTER, M.D., New York 158

7. Two Cases of Iridotomy under Discouraging Conditions. By Dr. **F. M. Wilson**, Bridgeport, Conn. (With a figure on Text-Plate IX.) 164

8. Clinical Experience with Haab's Powerful Electro-Magnet. By Dr. **Herman Knapp** 167

9. Restoration of the Conjunctival Cul-de-sac in a Case of Total Symblepharon, by Means of Thiersch Skin Grafts. By **Charles H. May**, M.D., New York 182

10. The Law of Listing and Some Disputed Points about its Proof. By **Carl Weiland**, M.D., Philadelphia. (With two figures in the text) 191

11. Report of the Transactions of the Section of Ophthalmology and Otology at the New York Academy of Medicine. By Dr. **J. Herbert Claiborne**, Secretary 200

I.—Ophthalmological part of the meeting of January 16, 1899:

Dr. **Walter B. Johnson.** Portable magnet for removing iron foreign bodies from the interior of the eye, 200.

Dr. **Arnold Knapp.** Extensive empyema of the frontal and ethmoidal sinuses with exophthalmos, treated according to Jansen's method, 200; Blepharoplasty, 200.

Dr. **A. E. Davis.** Blepharoplasty for epithelioma of each lid of the left eye, 200.

PAGE

Dr. **Rudolph Denig.** Varicose veins of the orbit, 201.

Dr. **S. M. Payne.** Artery projecting into the vitreous humor, 201.

Dr. **Wilbur B. Marple.** Thiersch graft in the lower conjunctival sac, 201.

Dr. **E. S. Thompson.** Leukosarcoma, 201.

Dr. **Henry D. Noyes.** Muscular insufficiency, 201.

II.—Meeting of February 20, 1899:

Dr. **H. Knapp.** Case of purulent cyclitis, 206; Case of cholesterinic degeneration of an eye from which a chip of steel had been extracted with a magnet ten years before, 206.

Dr. **W. E. Lambert.** Case in which he had relieved a very acute attack of glaucoma, resulting from an extensive incarceration of the iris, by making an anterior sclerotomy, 207.

Dr. **J. E. Weeks.** Case of partial atrophy of the optic nerves due to prolonged uterine hemorrhage, 207.

Dr. **J. H. Claiborne.** Operation for symblepharon, 208; Lower lid of right eye struck by a buck-shot from a toy rifle, 208; Specimen of melano-sarcoma, 209.

Dr. **Ward A. Holden.** Pathology of the amblyopia following profuse hemorrhage and of that following the ingestion of wood alcohol, as determined experimentally, 209.

12. Systematic Report on the Progress of Ophthalmology in the Third Quarter of the Year 1898. By Dr. **St. Bernheimer,** etc. Translated by Dr. WARD A. HOLDEN 211

A.—Prof. C. HORSTMANN. General ophthalmological literature, 211; General pathology, diagnosis, and therapeutics, 212; Instruments and remedies, 216.

B.—Dr. ST. BERNHEIMER. Anatomy, 219; Physiology, 221; Refraction and accommodation, 223; Muscles and nerves, 224.

C.—Prof. P. SILEX. Lids, 226; Lachrymal apparatus, 227; Orbit and neighboring cavities, 228; Conjunctiva, 231; Cornea, sclera, and anterior chamber, 234.

D.—Dr. O. BRECHT. Lens, 236; Iris, 237; Vitreous, 238; Glaucoma, 239; Sympathetic ophthalmia, 240.

E.—Prof. R. GREEFF. Retina, 241; Optic nerve, 242; Injuries, foreign bodies, parasites, 244; Ocular disturbances in general affections, 247.

13. Book Reviews and Notices. (Continued from page 123). . . . 250

XVIII.—An American Text-Book of Diseases of the Eye, Ear, Nose, and Throat. Edited by G. E. De Schweinitz and B. Alex. Randall.

XIX.—A Practical Handbook of the Muscular Anomalies of the Eye. By Howard F. Hansell and Wendel Reber.

XX.—A Treatise on Unripe Cataract. By Wm. A. M'Keown.

XXI.—Recherches anatomiques et cliniques sur le glaucome et les neoplasmes intraoculaires. By Prof. Panas and Dr. Rochon-Duvigneaud.

XXII.—Glaucoma; its Symptoms, Varieties, Pathology, and Treatment. By Alex. W. Stirling, M.D.

XXIII.—Communications from the Eye Clinique of the Carolinian Med.-Chir. Institute of Stockholm (in German). By Prof. J. Widmark.

14. Miscellaneous Notes 257

Society Meetings and Elections.
Appointments.

15. Obituary 257

16. Journal News 258

17. Contents of the Last Numbers of the *Archiv für Augenheilkunde* (German Edition of these ARCHIVES) 259

NUMBER 3.

PAGE

1. A Case of Paralysis of Divergence: its Bearing upon the Theory of Squint and Heterophoria. By Dr. **Alexander Duane,** New York. (With a text figure) 261

2. A Further Contribution to the Extraction of Particles of Steel or Iron with Haab's Large Electro-Magnet. By **A. Barkan,** M.D., San Francisco 282

3. Bullet Wound through Head with Loss of Right Eye and Vision Much Impaired in Left. By Dr. **J. H. Delany,** Erie, Pa. . 289

4. The Use of the Extract of the Suprarenal Capsule in Diseases of the Eye. By **W. H. Bates,** M.D., New York 293

5. Concerning the Bacteriology of Acute Catarrhal Conjunctivitis. By **C. A. Veasey,** A.M., M.D., Philadelphia 301

6. On the Injection of a Weak Sterile Salt Solution into Collapsed Eyes. By **Herman Knapp** 308

7. Note on the Use of Euphthalmin. By **Herman Knapp** . . 313

8. Note on the Use of Holocain. By **Herman Knapp** . . . 315

9. The Nerves of the Human Lid. By Dr. **Ludwig Bach.** Translated by Dr. MATTHIAS LANCKTON FOSTER, New York. (With Plates XII. and XIII. of Vol. XXXIII. of German Edition) . 317

10. The Corneal and Scleral Nerves as Shown by Golgi-Cajal's Osmium Bichromate Silver Method. By Dr. **Ludwig Bach.** Translated by Dr. MATTHIAS LANCKTON FOSTER, New York. (With three Illustrations on Plates XIV. and XV. of Vol. XXXIII. of German Edition) 320

11. Description of a Portable Electro-Magnet, an Original Device, to be Used in Connection with any Incandescent Electric-Light Current, for Removal of Pieces of Steel from the Interior of the Eyeball. By Dr. **Walter B. Johnson,** Paterson, N. J. (With four figures in the text) 326

12. Report of the Section of Ophthalmology and Otology of the New York Academy of Medicine. By Dr. **J. Herbert Claiborne,** Secretary 330

13. Systematic Report on the Progress of Ophthalmology in the Fourth Quarter of the Year 1898. By Dr. **St. Bernheimer,** etc. Translated by Dr. WARD A. HOLDEN 335

A.—Prof. C. HORSTMANN. General ophthalmological literature, 335; General pathology, diagnosis, and therapeutics, 338; Instruments and remedies, 340.

B.—Dr. ST. BERNHEIMER. Anatomy, 342; Physiology, 342; Anomalies of refraction and accommodation, 344; Muscles and nerves, 345.

PAGE

C.—Prof. P. Silex. Lids, 347; Lachrymal affections, 348; Orbit and neighboring cavities, 349; Conjunctiva, 351; Cornea, sclera, and anterior chamber, 355.

D.—Dr. O. Brecht. Lens, 357; Iris, 358; Choroid, 359; Vitreous, 360; Glaucoma, 360; Sympathetic ophthalmia, 362.

E.—Prof. R. Greeff. Retina and functional disturbances, 362; Optic nerve, 366; Injuries, foreign bodies (parasites), 367; Ocular disturbances in general diseases, 368.

14. Notices and Reviews of Books 372

XXIV.—Defective Eyesight. By D. B. St. John Roosa.

XXV.—Leçons de Clinique Ophtalmologique. By Prof. Ph. Panas.

XXVI.—A Text-Book of Ophthalmology. By Prof. Ernest Fuchs.

15. Note of Correction 377

NUMBER 4.

1. Hyperostosis Cranii, with the Report of a Case Leading to Exophthalmus and Blindness. By Dr. **F. W. Ellis,** Monson, Mass. (With three photographs on Text-Plate X.) 379

2. A Contribution to the Technique of Advancement for Strabismus. By Prof. **Schweigger,** Berlin. Translated by Dr. Ward A. Holden. (With one figure in the text) 386

3. Disturbances of Circulation in the Retina from Arterio-Sclerosis. By **C. Zimmermann,** M.D., Milwaukee, Wis. 390

4. Tuberculous Iritis, with Parenchymatous Keratitis. By Dr. **S. Schultze,** Frankfort-on-the-Main. Abridged Translation by Dr. Ward A. Holden. (With two figures on Plate XI., Vol. XXXIII., German Edition) 399

5. Amaurosis Following the Entrance of a Well after the Use of Dynamite. By **L. D. Brose,** M.D., Ph.D., Evansville, Ind. . . 402

6. A Case of Poisoning from the Use of Eserine in the Eyes. By **Clarence R. Dufour,** Phar.D., M.D., Washington, D. C. . 407

7. Refraction in Ancient Times. By Dr. **Vincenz Fukala,** Vienna. Abridged Translation by Dr. Colman W. Cutler, New York . 409

8. On Operations which Increase the Motility of Artificial Eyes, and their Partial Replacement by a New Prothesis of a Peculiar Form. By Dr. **Hugo Wolff,** Berlin. Abridged Translation by Dr. Colman W. Cutler, New York. (With two figures in the text) 411

9. Conjunctivitis Folliculosa and Trachoma. By Dr. **O. Walter,** Odessa. Abridged Translation by Dr. Colman W. Cutler, New York 413

PAGE

10. The Light Sense and Color Sense in Diseases of the Retina, Choroid, and Optic Nerve. By Dr. **Hans Krienes,** Breslau. Abridged Translation by Dr. COLMAN W. CUTLER, New York. (With Plates XXII.–XXIII. of Vol. XXXIII., German Edition) . 416

11. Coloboma of Both Optic Nerves without Coloboma of the Uveal Tract. By Prof. **F. Hosch,** Basle. Abridged Translation by Dr. WARD A. HOLDEN. (With two figures on Plate II. of Vol. XXXIV., German Edition) 428

12. Progressive Paralysis of the Levator. By Prof. **P. Silex,** Berlin. Translated by Dr. MATTHIAS LANCKTON FOSTER, New York . 430

13. Report of the Transactions of the Section in Ophthalmology and Otology of the New York Academy of Medicine, April 17 and May 15, 1899. By Dr. **J. Herbert Claiborne,** Secretary . . 441

14. Systematic Report on the Progress of Ophthalmology in the First Quarter of the Year 1899. By Dr. **St. Bernheimer,** etc. Translated by Dr. WARD A. HOLDEN 448

A.—Prof. HORSTMANN. General ophthalmological literature, 448; General pathology, diagnosis, and therapeutics, 450; Instruments and remedies, 454.

B.—Dr. ST. BERNHEIMER. Anatomy, 455; Physiology, 456; Refraction and accommodation, 457; Muscles and nerves, 458.

C.—Dr. R. SCHWEIGGER. Lids, 461; Lachrymal apparatus, 462; Orbit and neighboring cavities, 463; Conjunctiva, 465.

15. Report of the Transactions of the American Ophthalmological Society at its Meeting at New London, Conn., July 19 and 20, 1899. By Dr. **H. O. Reik,** Baltimore 469

I.—Demonstration of a New Office Stereoscope. By Dr. R. H. Derby, New York, 469.

II.—Description of the Reflecting Phorometer and a Discussion of the Possibilities of Torsion of the Eyes. By Dr. F. H. Verhoeff, Baltimore, 470.

III.—Congenitally Inefficient External Rectus and Binocular Vision. By Dr. J. O. Tansley, New York, 471.

IV.—A Case of Primary Tumor of the Optic Nerve. By Dr. F. Buller, Montreal, 472.

V.—A Case of Primary Non-Pigmented Sarcoma of the Left Upper Lid. By Dr. C. A. Veasey, Philadelphia, 473.

VI.—An Instrument Intended to Facilitate the Operation of Capsulotomy. By Dr. F. Buller, Montreal, 473.

VII.—A Case of Expulsive Intra-Ocular Hemorrhage after Preliminary Iridectomy for Cataract. By Dr. R. L. Randolph, Baltimore, 473.

VIII.—Retinitis Albuminurica as a Factor in Secondary Glaucoma. By Dr. Chas. Stedman Bull, New York, 475.

IX.—Anomalies in the Epithelium of the Crystalline Lens and Anterior Polar Cataract. By Dr. A. Alt, St. Louis, 476.

X.—A Method of Converting the Alternating Current for Use in Connection with the Johnson Magnet. By Dr. W. B. Johnson, Paterson, N. J., 476.

XI.—Report of Three Cases of Magnet Extraction of Steel from the Eyeball, through the Point of Entrance. By Dr. W. B. Johnson, Paterson, N. J., 476.

XII.—A Cyst of the Vitreous. By Dr. J. O. Tansley, New York, 478.

XIII.—A Case of Sympathetic Ophthalmia, Due to Glioma Retinæ in the Fellow Eye. By Dr. A. Alt, St. Louis, 478.

XIV.—A Case of Spontaneous Rupture of the Eyeball. By Dr. B. L. Millikin, Cleveland, 478.

XV.—Multiple Rupture of Sphincter of the Iris, with Subsequent Development of Myopic Astigmatism. By Dr. W. F. Mittendorf, New York, 479.

PAGE

XVI.—Normal Pupillary Reaction, with Microscope for its Measurement. By Dr. Lucien Howe, Buffalo, 479.

XVII.—The Value of Acoin as a Local Anæsthetic in Eye Surgery. By Dr. R. L Randolph, Baltimore, 479.

XVIII.—More Uniform Tests for Vision, Color Sense, and Hearing. By Dr. C. H. Williams, Boston, 480.

XIX.—A Modified Perimeter. By Dr. C. H. Williams, 481.

16. Book Notices 482

XXVII.—Progressive Medicine. Vol. II. Edited by Hobart Amory Hare, M.D.

XXVIII.—Die Sehleistungen von 50,000 Breslauer Schulkindern (The Acuteness of Vision of 50,000 Breslau School-Children). By Prof. Hermann Cohn.

17. Miscellaneous Notes 484

18. Obituary 484

19. Contents of the last numbers of the *Archiv für Augenheilkunde* (German Edition of these ARCHIVES) 484

NUMBER 5.

1. Eye Strain in its Relation to the Vertical Centration of Lenses. By **Burton L. Dunn**, B.S., M.D., Syracuse, N. Y. . . . 487

2. Some Aids in Ophthalmic Teaching. By Prof. **F. Dimmer**, Innsbruck. Translated by Dr. MATTHIAS LANCKTON FOSTER, New York. (With six figures in the text) 494

3. The Question as to the Presence of Ganglion Cells in the Iris. By Dr. **N. Andogsky**, St. Petersburg. Translated by Dr. WARD A. HOLDEN. (With seven figures on Plates III.–IV. of Vol. XXXIV., German Edition) 510

4. Suppurative Keratitis. By Dr. **H. Schultz**, Berlin. Translated by Dr. MATTHIAS LANCKTON FOSTER, New York . . . 516

5. On the Changes in the Eye after Ligation of the Gall Bladder (an Experimental Contribution to the Knowledge of Ophthalmia Hepatica). By Dr. **W. Dolganoff**, St. Petersburg. Abridged Translation by Dr. WARD A. HOLDEN. (With fourteen figures on Plates XI.–XII. of Vol. XXXIV., German Edition) . . 533

6. A Contribution to the Subject of Tuberculosis of the Conjunctiva. By Dr. **Carl Grunert**, Tübingen. Abridged Translation by Dr. WARD A. HOLDEN 540

7. Experiences and Studies with Regard to Strabismus. By Dr. **Ph. Steffan**, Frankfort-on-the-Main. Translated by Dr. MATTHIAS LANCKTON FOSTER, New York 547

8. Abstract of the Papers in Vol. XXXIII. (1896) of the German Edition of these ARCHIVES not Previously Translated. By Dr. **Colman W. Cutler** 564

I.—Antisepsis or Asepsis in Operations on the Eyeball. A Comparative Bacteriological Study. By Dr. Ludwig Bach, Würzburg, 564.

II.—Concerning the Danger of Infection in Different Operations on the Eye, and the Conditions Affecting the Progress of Suppuration from its Anterior to its Deeper Portions. By Dr. N. Andogsky, St. Petersburg, 565.

PAGE

IV.—The Amblyopia Associated with Strabismus. By Dr. Guillery, Cologne, 567.

V.—Is Intermarriage a Factor in the Causation of Pernicious Myopia? By Dr. Julius Wolff, Cologne, 568.

VI.—Report of 295 Cataract Operations in Prof. Schöler's Clinic, Berlin. By Dr. Walter Albrand, Berlin, 568.

VII.—A Case of Paralysis of the Trigeminus. By Dr. J. K. A. Wertheim Salomonson and Dr. C. H. A. Westhoff, Amsterdam, 569.

XI.—Analysis of the Process of Touching Objects Looked at. By Dr. Moritz Sachs, Vienna, 571.

XII.—Advancement of the Levator Palpebræ Superioris with Division of its Insertion. Two New Methods in Congenital Ptosis. By Dr. Hugo Wolff, Berlin, 575.

XVI.—Statistical Contribution to the Study of Congenital Amblyopia. By Dr. M. Straub, Amsterdam, 576.

XVIII.—Investigations as to the Occurrence of Striated Opacities of the Cornea. By Prof. Hess, Leipsic, 578.

XIX.—Notes on Changes in Neuroglia Cells in Inflamed and Degenerated Optic Nerves. By Dr. Richard Greeff, Berlin, 579.

XX.—The Etiology of Pseudo-Membranous Conjunctivitis. By Dr. Fritz Schanz, Dresden, 581.

XXVII.—The Transplantation of Bridge-shaped Conjunctival Flaps for the Protection of Large Corneal Defects with Prolapse of the Iris. By Prof. Leopold Weiss, Heidelberg, 581.

XXIX.—The Prophylaxis of Sympathetic Ophthalmia. By Dr. George Abelsdorff, Berlin, 587.

9. Systematic Report on the Progress of Ophthalmology in the First Quarter of the Year 1899. By Dr. **St. Bernheimer,** etc. Translated by Dr. WARD A. HOLDEN 588

A.—Dr. SCHWEIGGER. Cornea, sclera, and anterior chamber, 588.

B.—Dr. O. BRECHT. Lens, 591; Choroid, 595; Vitreous, 597; Glaucoma, 598; Sympathetic ophthalmia, 599.

C.—Prof. GREEFF. Retina and functional disturbances, 600; Optic nerve, 604; Injuries, foreign bodies, and parasites, 605; Ocular disturbances in general diseases, 606.

10. Book Notices 609

XXIX.—Die Verletzungen des Auges. By Dr. E. Praun.

XXX.—Beitrag zur Casuistik des Exophthalmus pulsans. By Dr. Emil Keller.

NUMBER 6.

1. On Spontaneous and Post-Operative Detachment of the Retina in Myopic Eyes. By Prof. **Conrad Fröhlich,** Berlin. Translated from Germ. Ed., Vol. XXXVIII., 1, 1898, by Dr. WARD A. HOLDEN 611

2. On a Case of Papillo-Retinitis Due to Chlorosis. By Dr. **W. Schmidt.** Translated by Dr. WARD A. HOLDEN. (With two charts of the visual field on Plate VI. of Vol. XXXIV., German Edition, 1897) 619

3. Contributions to the Embryology of the Lens. By Dr. **C. Ritter,** Bremervörde. Abridged translation by Dr. WARD A. HOLDEN. (With six figures on Plate X. of Vol. XXXIV., German Edition, 1897) 624

4. Binocular Vision after Extraction of Senile Cataract of One Eye. By Dr. **Edgar S. Thomson,** New York 627

PAGE

5. Buphthalmus with Lenticonus Posterior. By Dr. **Ed. Pergens,** Brussels. Translated by Dr. WARD A. HOLDEN. (With four figures on Plate I., Vol. XXXV., German Edition, 1897) . . 629

6. Abstracts of the Papers in Vol. XXXIV. (1897) of the German Edition of these ARCHIVES not Previously Translated. By Dr. **Ward A. Holden** 637

VI.—Bacteriological Investigations on the Influence of Antiseptic Dressings on the Bacteria in the Conjunctival Sac and on the Margin of the Lid. By Dr. L. Bach, Würzburg, 637.

X.—On Hutchinson's Affection of the Fundus (Retinitis Circinata, Fuchs.) By Prof. Goldzieher, Budapest, 638.

XII.—On the Pathological Anatomy of Spontaneous Luxation of the Lens into the Anterior Chamber. By Dr. K. Rumschewitsch, Kieff, 639.

XIII.—The Diminution in the Refraction of the Eye Caused by the Removal of the Lens By Dr. Maximilian Salzmann, Vienna, 640.

XVIII.—A Clinical and Pathological Contribution to the Subject of Tuberculosis of the Lachrymal Gland. By Dr. Jacob Süsskind, Stuttgart, 640.

XIX.—A Case of Bilateral and Non-Inflammatory Glaucoma in Early Life Associated with Retinitis Pigmentosa and Myopia. By Dr. Heinersdorff, Elberfeld, 642.

XXI.—Purulent Keratitis in Man. A Bacteriological and Clinical Study. By Drs. L. Bach and R. Neumann, Würzburg, 643

7. Report on the Proceedings of the Section of Ophthalmology at the Annual Meeting of the British Medical Association, at Portsmouth, August, 1899. By **W. J. Lister,** Esq. 644

8. Report of the Proceedings of the Ninth International Ophthalmological Congress, Utrecht, August 14–18, 1899. By Prof. **R. Greeff,** Berlin. Translated by Dr. WARD A. HOLDEN . . 661

9. Systematic Report on the Progress of Ophthalmology in the Second Quarter of the Year 1898. By Dr. **St. Bernheimer,** etc. Transtated by Dr. WARD A. HOLDEN 681

A.—Prof. HORSTMANN. General ophthalmological literature, 681; General pathology, diagnosis, and therapeutics, 683; Instruments and remedies, 686.

B.—Dr. ST. BERNHEIMER. Anatomy, 688; Physiology, 689; Refraction and accommodation, 690; Muscles and nerves, 691.

C.—Dr. SCHWEIGGER. Lids, 693; Lachrymal apparatus, 696; Orbit, 697; Conjunctiva, 698; Cornea, sclera, and anterior chamber, 701.

D.—Dr. O. BRECHT. Lens, 703; Iris, 705; Choroid, 707; Vitreous, 708; Glaucoma, 708; Sympathetic ophthalmia, 709.

E.—Prof. GREEFF. Retina and functional disturbances, 709; Optic nerve, 711; Injuries, foreign bodies, and parasites, 712; Ocular affections in general diseases, 713.

10. Book Notices 716

XXXI.—System of Diseases of the Eye by American, British, Dutch, French, German, and Spanish Authors. Edited by Norris and Oliver.

XXXII.—Optics: A Manual for Students. By A. S. Percival.

XXXIII.—Hand-book of Optics, for Students of Ophthalmology. By William Norwood Suter.

11. Obituary 722

12. Contents of the last numbers of the *Archiv für Augenheilkunde* (German edition of these ARCHIVES) 722

13. Index of Authors and Subjects of Vol. XXVIII. 725

14. General Index of Authors and Subjects of Vols. XXII. to XXVIII., Inclusive 733

CONTENTS OF VOLUME XXVIII., NUMBER 1.

PAGE

1. Extirpation of the Lacrymal Sac and Gland. By Dr. **C. R. Holmes,** Cincinnati, O. (With 12 illustrations, on Text-Plates I.–VI., of cases and dissections. Also reports of 17 operations) . 1

2. Declination of the Vertical Meridians of the Retina. By **George T. Stevens,** M.D., Ph.D., New York 24

3. Experiments on the Germicide Properties of Certain Eye Salves. By **Rosa Welt Straus,** M.D., Brooklyn 40

4. Holocain in Ophthalmic Surgery; Its Superiority over Cocaine; Its Therapeutic Value. By **Hasket Derby,** M.D., Boston . . 45

5. A Case of Extensive Chronic Empyema of the Frontal and Ethmoidal Sinuses with Exophthalmos; Operation; Recovery. By **Arnold H. Knapp,** M.D. (With a figure on Text-Plate VII.) . 50

6. The Pathological Anatomy of Polypoid Tumors of the Conjunctiva. By Dr. **Ischreyt.** Translated by Dr. COLEMAN W. CUTLER, New York. (With a lithographic plate Taf. III. of Vol. XXXII. of German edition) 55

7. Abstracts of Articles, not Previously Translated, in Vol. XXXII. (1896) of the *Archiv für Augenheilkunde.* By Dr. **Coleman W. Cutler,** New York 58

IV.—The Etiology and Treatment of Certain Forms of Conjunctivitis Pseudo-Membranosa. By Dr. Orlando Pes, 58.

VIII.—Experiments on the Action of Subconjunctival Injection of Salt Solutions, upon Absorption from the Anterior Chamber and the Vitreous. By Dr. Carl Mellinger, Basel, 60.

IX.—The Cortical Pupillary Reflex of Haab in its Relation to the Hemiopic Pupillary Reaction. By Dr. Heddaeus, Essen a. d. Ruhr, 61.

X.—Partial, Isolated Paresis of the Orbicularis Palpebrarum. By Dr. P. Silex, Berlin, 62.

XI.—A Consideration of Dr. Ahlström's Article on the Antiseptic Action of the Tears. By Dr. Ludwig Bach, Würzburg, 64.

XVI.—Tuberculosis of the Cornea. By Dr. Ludwig Bach, Würzburg, 64.

XVIII.—The Relations between Disturbances of Orientation and Unilateral and Bilateral Hemianopsia. By Dr. A. Peters, Bonn, 66.

XXII.—A Comparative Investigation of Certain Therapeutic Measures Associated with Leucocytosis in the Staphylococcus Ulcer of the Cornea. By Dr. Otto von Sicherer, 70.

XXIII.—A Contribution to the Study of Epidemic Night-Blindness. By Dr. Schtschepotzew, in Kiew, Russia, 72.

XXVI.—Historical Remarks on the Anatomy of the Ora Serrata. By Dr. E. Berger, Paris, 73.

PAGE

XXVII.—A Case of Unilateral Loss of the Pupillary Light-Reflex. By Dr. L. Caspar, Mülheim-a.-Rh., 73.

XXVIII.—Adenoma of the Ciliary Body as Cause of Glaucoma. By Dr. Ed. Pergens, Brussels, 74.

XXIX.—Sarcoma of the Iris. By Dr. F. Werther, Warsaw, 75.

8. Systematic Report on the Progress of Ophthalmology in the Second Quarter of the Year 1898. By Dr. **St. Bernheimer,** in Vienna; Dr. **O. Brecht,** Prof. **R. Greeff,** Prof. **C. Horstmann,** and Prof. **P. Silex,** in Berlin; with the assistance of Dr. G. Abelsdorf, Berlin; Dr. Swan M. Burnett, Washington; Dr. Dalèn, Stockholm; Dr. Herrnheiser, Prague; Prof. Hirschmann, Charkow; Dr. Krahnstöver, Rome; Dr. P. von Mittelstädt, Metz; Prof. Da Gama Pinto, Lisbon; Dr. Richard Schweigger, Berlin; Dr. Sulzer, Paris; Dr. L. Werner, London; Dr. C. H. A. Westhoff, Amsterdam; and others. Translated by Dr. WARD A. HOLDEN 77

A.—Dr. C. HORSTMANN. General ophthalmological literature, 77; General pathology, diagnosis, and therapeutics, 79; Instruments and remedies, 80.

B.—Dr. ST. BERNHEIMER. Anatomy, 84; Physiology, 85; Refraction and accommodation, 86; Muscles and nerves, 87.

C.—Dr. P. SILEX. Lids, 89; Orbit and neighboring cavities, 90; Conjunctiva, 92; Cornea, sclera, and anterior chamber, 95.

D.—Dr. O. BRECHT. Lens, 98; Iris, 99; Choroid, 100; Vitreous, 101; Glaucoma, 102; Sympathetic ophthalmia, 104.

E.—Dr. R. GREEFF. Retina and functional disturbances, 104; Optic nerve, 106; Injuries, foreign bodies, parasites, 107; Ocular disturbances in general diseases; 108.

9. Report of the Transactions of the Section on Ophthalmology and Otology of the New York Academy of Medicine. By Dr. **W. B. Marple,** Secretary 112

10. Book Notices 116

I.—Report on the Ophthalmic State of the Poor-Law Children in the Metropolis. By Sydney Stephenson, Esq., M.B.

II.—Gesichtsstörungen und Uterinleiden. Von Prof. Dr. A. Mooren.

III.—Das Sideroscop u. seine Anwendung. Von Dr. Eduard Asmus.

IV.—Über der Verwertbarkeit der Bindehaut in der practischen u. operativen Augenheilkunde. (On the Use of the Conjunctiva in Eye-Surgery.) Von Dr. Hermann Kuhnt.

V.—Über den künstlichen Hornhautersatz. (The Artificial Restitution of the Cornea.) By Fritz Salzer.

VI.—The Ophthalmoscope. A Manual for Students. By Gustavus Hartridge.

VII.—Traité d'Ophtalmoscopie. By Etienne Rollet.

VIII.—Atlas der äusseren Erkrankungen des Auges, nebst Grundriss ihrer Pathologie und Therapie. By Prof. O. Haab.

IX.—Atlas of External Diseases of the Eye. By A. Maitland Ramsay, M.D.

X.—Handeling by het Oogheelkundig Onderzoek. (Technique of Ophthalmic Examination.) By Dr. H. Snellen, Jr.

XI.—Oogheikundige Verslagen en Bydragen, uitgegeven met het Jaarverslag van het Nederlandsch Gasthuis voor Ooglyders, No. 39.

XII.—Anleitung zur microscopischen Untersuchung des Auges. By Prof. R. Greeff.

XIII.—Pathologie des Auges. By Th. Axenfeld and A. E. Fick.

XIV.—Ophtalmologie du xii Congrès international de médecine de Moscou.

XV.—Die Neurologie des Auges. Ein Handbuch für Nerven- und Augenärzte. By D. H. Wilbrand.

XVI.—Diseases of the Eye. A Handbook of Ophthalmic Practice for Students and Practitioners. By G. E. De Schweinitz.

XVII.—The Crystalline Lens System. By Louis Stricker, M.D.

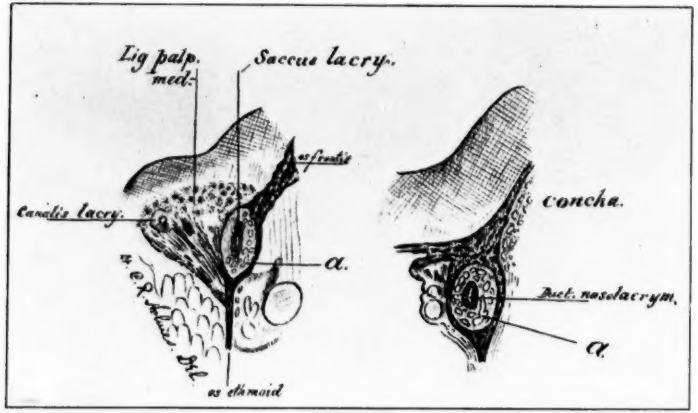

FIG. 1.

Horizontal section through lacrymal sac. From Merkel's *Anatomie.*

a.—Venous plexus.

FIG. 2.

Horizontal section through lacrymal duct (bony canal). From Merkel's *Anatomie.*

a.—Venous plexus in submucosa.

FIG. 3.

CASE NO. 5.—Extirpation of the lacrymal sac and gland, left side, March 17, 1896. Photographed on the sixth day after the operation. No subconjunctival hemorrhage.

te I.

side, March 17, 1896. Photographed on the sixth day after the operation. No subconjunctival hemorrhage.

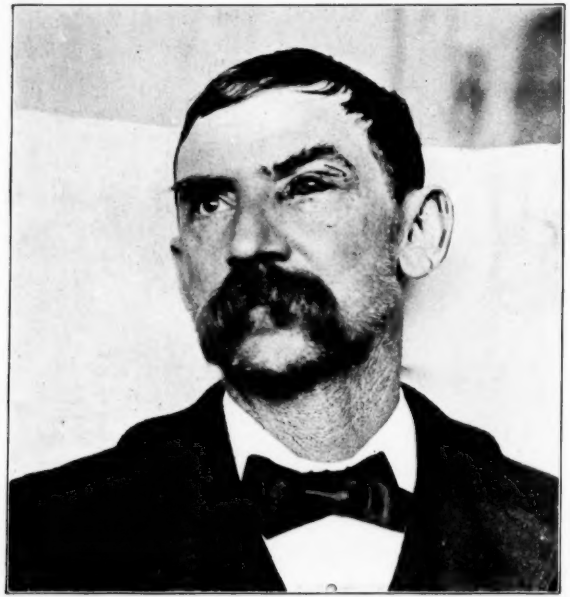

FIG. 4.

CASE No. 9.—Extirpation of sac and gland. Photograph taken on the sixth day after operation. Line of incision in part seen below the brow. Subconjunctival hemorrhage marked.

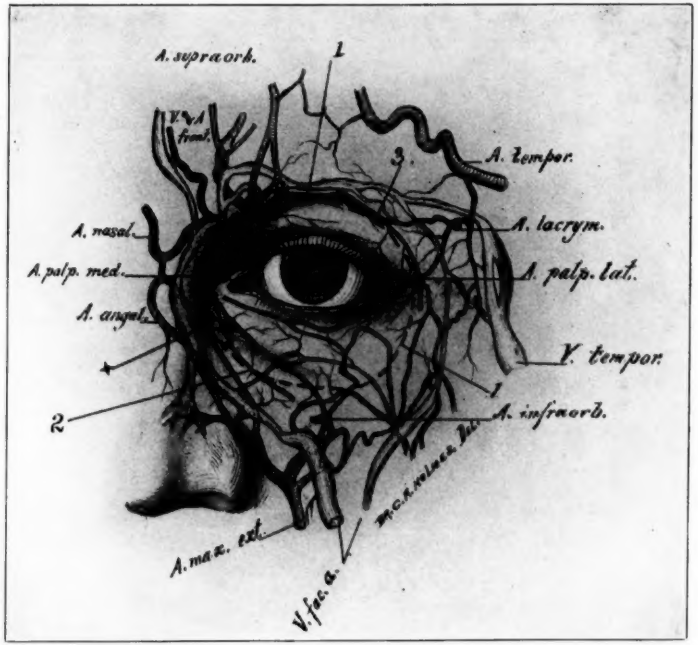

FIG. 5.

Facial arteries and veins surrounding the eye. Modified from Merkel's *Anatomie.*

1.—Outline of bony orbital margin.
2.—Incision for the removal of lacrymal sac.
3.—Incision for the removal of lacrymal gland.
+ Fossa sacci lacrym.

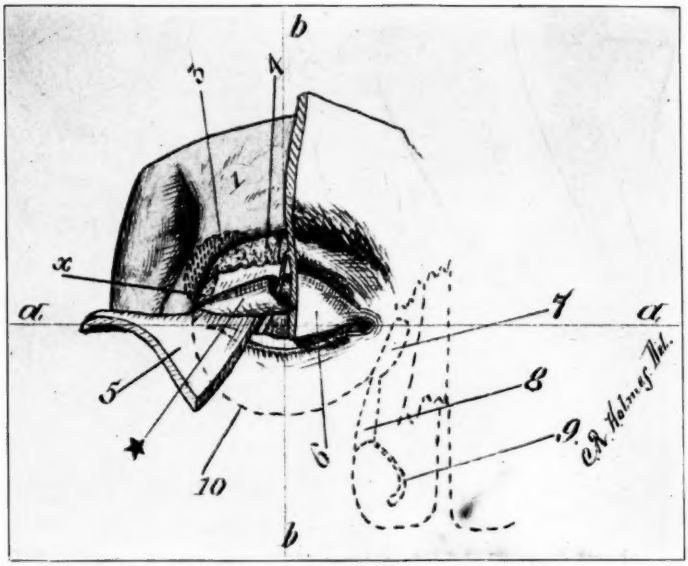

FIG. 6.

1.—Frontal bone. 3.—Superior lacrymal gland. x.—Inferior lacrymal gland. 4.—Orbital fat. 5.—Flap of soft tissue from brow. *—Septum orbitale, dissected from orbital margin and reflected downwards, exposing the orbital fat (of which a triangular mass often passes outwards and downwards in front of the gland) in most cases the anterior edge of the gland lies 2 *mm* upwards and backwards under the orbital margin.

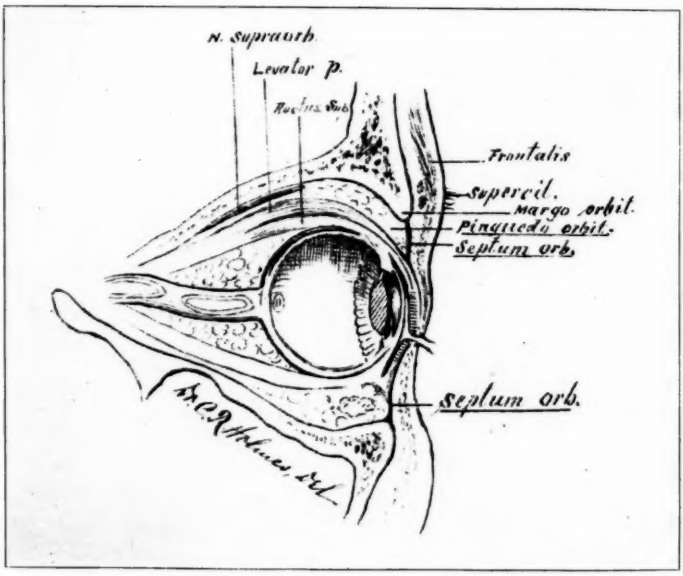

FIG. 7.

Perpendicular section through centre of cornea and optic foramen.
Slightly modified from Merkel.

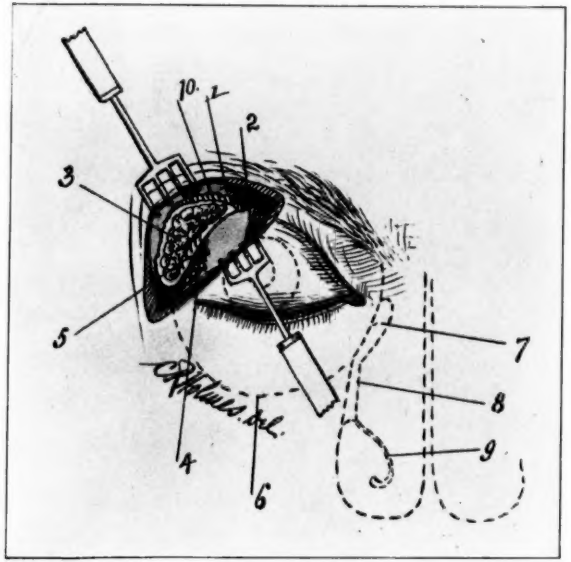

FIG. 8.

Partly diagrammatic.

1.—Bony margin of orbit, partly removed to expose the gland. 2.—Septum orbitale [1] 3.—Superior lacrymal gland. 4.—Inferior lacrymal gland. 5.—Ducts from lacrymal gland. 6.—Dotted line showing margin of bony orbit. 7.—Fossa of lacrymal sac. 8.—Lacrymal duct. 9.—Inferior turbinated. 10.—Fascia separating the superior and inferior glands (diagrammatic).

[1] Syn. *a*. Fascia palpebralis. *b*. Lig. palpebr. *c*. Fascia tarso-orbitalis. *d*. Lig. tarsi.

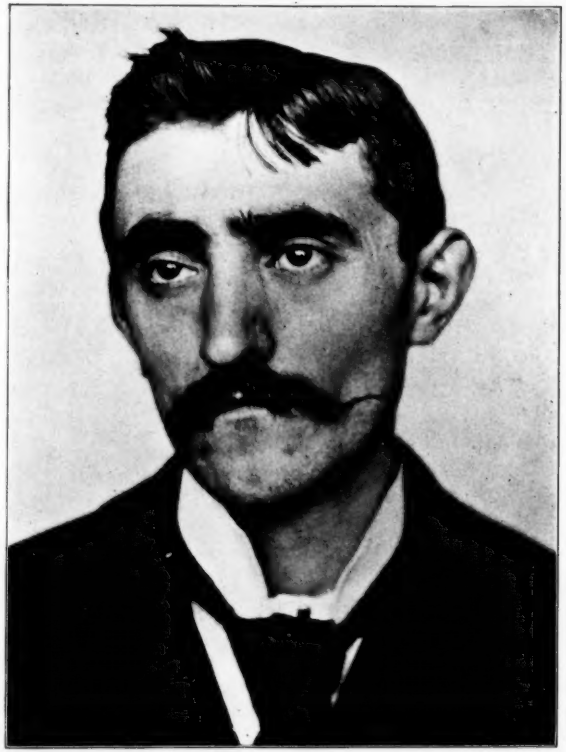

FIG. 9.

JOHN SEYLER—CASE 1.—Double extirpation of both sacs and glands in 1891. Photographed April 20, 1898.

glands in 1891. Photographed April 20, 1898.

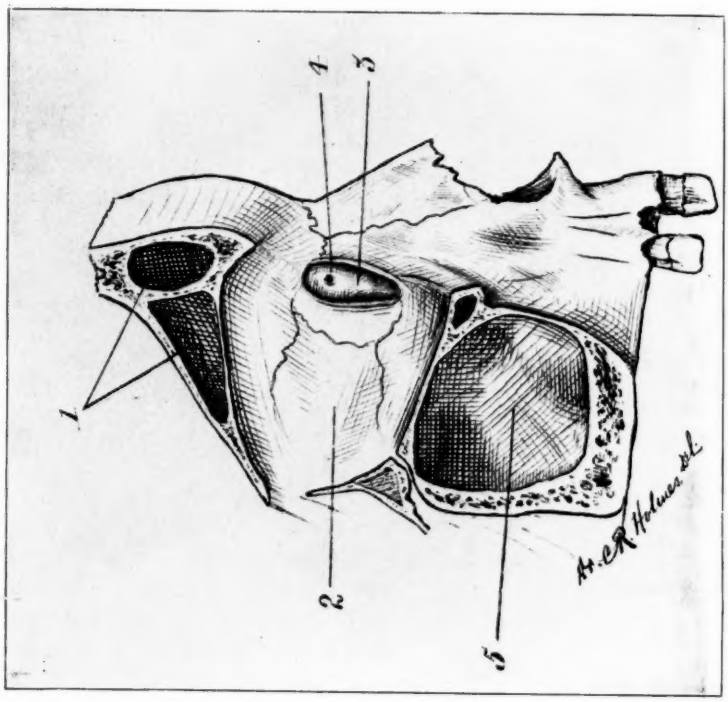

FIG. 10.

Perpendicular section through the right orbit, demonstrating tear-sac.

1.—Frontal sinus. 2.—Orbit. 3.—Lacrymal sac.
4.—Opening of common duct from canaliculi, into the sac. 5.—Highmore's antrum.

Perpendicular section through the right orbit, demonstrating tear-sac.

1.—Frontal sinus. 2.—Orbit. 3.—Lacrymal sac.
4.—Opening of common duct from canaliculi, into the sac. 5.—Highmore's antrum.

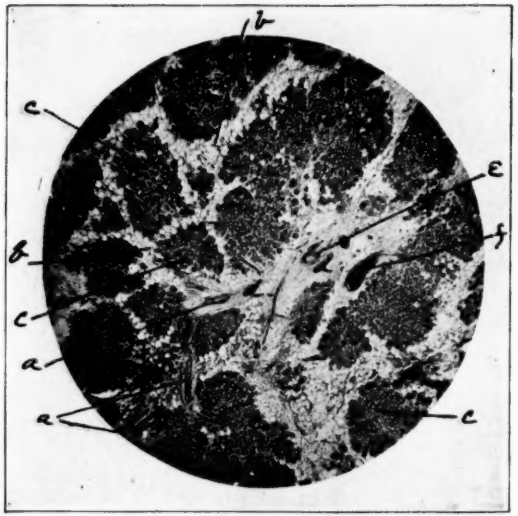

FIG. 11.

Lacrymal gland (from Case 8). (Magnified 40 times.)

a.—Gland duct. *b*.—Fat surrounding lobules. *c*.—Lobules of gland. *d*.—Connective tissue bearing ducts and vessels. *e*.—Vein. *f*.—Artery.

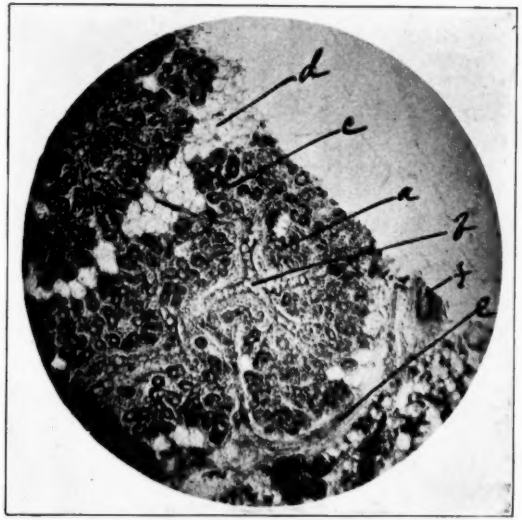

FIG. 12.

Lacrymal gland (from Case 8). (Magnified 130 times.)

a.—Single lobule. *b*.—A central duct around which the entire lobule is formed by branching ducts. *c*.—A terminal duct with acini clustered about it. *d*.—Fat. *e*.—Connective tissue. *f*.—Artery.

ARCHIVES OF OPHTHALMOLOGY.

EXTIRPATION OF THE LACRYMAL SAC AND GLAND.[1]

By Dr. C. R. HOLMES, Cincinnati, O.

(*With 12 illustrations of cases and dissections. Also reports of 17 operations.*)

ALTHOUGH advocating the extirpation of the lacrymal sac and gland in suitable cases, I am a firm believer in conservative surgery, so long as milder means will accomplish the desired object, to-wit: permanent cure of the affection within a reasonable time, and without subjecting the patient to prolonged and unnecessary suffering. I also believe that in the beginning of tear-sac affection, our first duty is *not* at once to slit the canaliculi and begin probing, lacerating or bruising a delicate and inflamed membrane, but that we should first thoroughly carry out antiphlogistic treatment in connection with careful attention to the nose and accessory cavities, which may embrace surgical measures, massage as advocated by Königshöfer, and cleansing of the sac by gentle syringing with mild astringents. And if, after this, it becomes necessary to probe, let us proceed gently; any one can make a false passage if enough strength is used. If, however, after careful and prolonged treatment, no permanent relief is obtained, then I believe that we are justified in an operation which will safely, quickly, and permanently, relieve the patient of an annoying epiphora, generally associated with painful recurrent inflammatory attacks of purulent dacryocystitis, which is always a menace to the safety of the eye should an avenue for the infection be created

[1] Read before the Section on Ophthalmology, at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Col., June 7–10, 1898.

either by accidental injury of the cornea, or by a necessity arising for surgical treatment of the eye.

The destruction of the tear sac by caustics dates back to the earliest history of surgery, but NANNONI—*Dissertazioni Chirurgiche*, Parigi, 1748—was the first to describe it as a special operation, which appears to have been resorted to only in extreme cases. With the advent of aseptic surgery, the slow and painful method of cure by caustic or cautery should be abandoned in favor of the total removal of the sac, with closure of the wound, and healing, as a rule, by primary union.

The extirpation of the lacrymal gland *when diseased*, also dates back to the early days of surgery, and the removal of the healthy gland was even advised by PAUL BERNARD fifty years ago for the relief of tearing, where the canal was hopelessly obliterated.

H. HAYNES WALTON, Surgeon to the Central London Ophthalmic Hospital, wrote in 1853: "Extirpation of a healthy *lacrymal gland* may be required when the natural channels that convey away the tears are lost."

LAWRENCE advocated and practised the extirpation of the *lacrymal gland* in 1867.

BERLIN, in *Klin. Monatsbl.*, 1868, reported a number of cases of extirpation of the *lacrymal sac*, which, however, attracted but little attention.

SCHREIBER reported in *Graefe's Archives of Ophthalmology*, vol. xxvii., 1881, forty cases of extirpation of the *lacrymal sac*, by Prof. Graefe in Halle, with excellent results in most of the cases.

S. C. AYRES reported one case of extirpation of the *lacrymal sac*, *Amer. Jour. of Ophthal.*, 1885.

DARRIER, in *Gaz. méd. de Paris*, 1886, recommends extirpation of the *lacrymal gland* in cases in which epiphora cannot be checked, or in which the permeability of the sac cannot be restored.

WECKER, in 1889, reported the extirpation of the *palpebral gland* in twenty-five cases.

R. BERLIN, in *Corresp.-Bl. d. Alg. Mecklenb. Ærzte-Vereins*, 1890, reported upon extirpation of the *lacrymal sac*.

KUHNT reported upon the extirpation of the *tear sac* in the Ophthalmological Society of Heidelberg, 1891.

L. MÜLLER, in *Klin. Monatsbl. f. Augenheilkunde*, 1893, reports twelve cases of extirpation of *lacrymal sac*, from Prof. Fuchs's clinic.

TRUE, in *Arch. d'Opht.*, xiii., 1893, writes on cases of extirpation of the *orbital or palpebral lacrymal gland* in simple and obstinate lacrymation.

TERSON, *Arch. d'Opht.*, xiii., 1893. On the extirpation of the *palpebral lacrymal gland.*

DEUTE, *Boll. d. Poliambulanza Ann.*, 1893. The rapid treatment of dacryocystitis.

OHLSTRÖM, *Eiva*, No. 16, 1894. On extirpation of the *lacrymal sac.*

REHR, Inaug. Dissert., Kiel, 1895, reports, from the Kieler clinic, 186 cases of *extirpation of the sac* performed since 1889 for dacryocystitis, with uniformly good results.

GUSTAF OHLSTRÖM, *Centralblatt für Augenheilkunde*, 1897. A new instrument to facilitate the extirpation of the *lacrymal sac.*

Dr. HOFFMAN, Transactions of the Twenty-fifth Ophthalmological Congress, Heidelberg, 1896. An operation for the extirpation of the *lacrymal sac.*

SCHIMANOWSKY, *Wjest. Ophth.*, xiii., 4–5, 1897. He recommends the extirpation of the *tear sac* in all obstinate cases of dacryocystitis.

TERSON, *Arch. d'Opht.*, xvii., 1898. Comparison between different cases of extirpation of the *palpebral lacrymal gland.*

Our modern text-books give but scant attention to the subject under discussion.

JULER, in his edition of 1893, states that he has never obliterated the lacrymal sac, and the removal of the lacrymal gland he speaks of only in connection with tumors.

SCHMIDT-RIMPLER, in his text-book, mentions that the lacrymal gland may require extirpation on account of malignant growths, and furthermore states: "Also for the relief of incurable epiphora, has the extirpation of the healthy gland been performed by Lawrence (1867), and

lately the removal of the orbital portion from without, through an opening in the skin, has been recommended."

FUCHS, in his latest edition (1898), speaks of the extirpation or destruction by caustics of the lacrymal sac, but refers only casually to the removal of the gland after stating that the moisture of the globe does not entirely depend upon the lacrymal gland, but that the conjunctival as well as the Krause-Waldeyer mucous glands participate in keeping the eyeball moist.

ELY D. NOYES speaks only of destruction of the sac by caustics or cauteries, and under the heading of "Tear Gland" he states: "The gland may be the seat of neoplasms, such as sarcoma and other tumors, and of cystoid degeneration, and is liable to chronic hypertrophy; but these conditions need no special consideration. *Its extirpation to cure epiphora was practised by Lawrence, but is not now approved.*"

From the foregoing we observe that the operation upon the sac has, although very slowly, gained adherents; but that the removal of the lacrymal gland was practically abandoned. The operations upon the gland reported by DeWecker and Terson were limited to that irregular aggregation of small nodules of gland tissue found under the upper lid, very variable in size, and called the secondary gland, which (or as much of it as can be found) can be removed under cocaine anæsthesia; the patient being directed to roll the eye downward and inward, when eversion of the upper lid will in some, but not all cases, bring into prominence the palpebral portion of the gland, which appears as a small irregular swelling. To me it appears more rational to remove the gland, which supplies perhaps 90 per cent. of the tears, leaving, if desired, the secondary gland to furnish a small quantity of fluid to dilute the mucous secretion, although even this is not necessary for the comfort of the eye under ordinary circumstances.

The reason for abandoning the removal of the orbital gland is no doubt attributed to failures, and one can readily understand how, before the days of aseptic surgery, there was much danger accompanying an operation which freely

invades the tissues of the orbital cavity; for if an inflammation should develop in such a wound as is produced by the extirpation of the gland, it would be very likely to lead to orbital cellulitis, with strangulation of the optic nerve and vessels, and loss of vision if not of the globe.

I believe we may safely state that, with strict attention to asepsis, the dangers from infection can now be entirely eliminated, and the results, both immediate and remote, are so highly satisfactory that I can see no reason why the operation should not be resorted to in all suitable cases.

I consider the **indications for the removal of the tear sac and gland** to be:

1st. In cases where it becomes necessary to operate upon the globe, as for cataract or glaucoma, especially so, should there not be sufficient time to carry out other methods of treatment.

2d. In patients who cannot devote the time, or who may be unable to endure the treatment by probing.

3d. *In all cases where conservative treatment has failed to cure within a reasonable time.*

An operation which only obliterates the canal without cutting off the annoying supply of tears which torments the patient for the rest of his life, is to my mind *a very incomplete piece of surgery.*

While epiphora in a small percentage of cases does result from displacement of the puncta either through injury, senile changes, or chronic inflammation of the lids, the affection in most cases is due to an inflammation of the sac. It is possible that a few of these cases result from infection carried from the conjunctival sac, but as a rule we must look upon the inflammation as an extension from the nose through the bony canal, with dilatation of the dense venous plexus which exists between the mucous membrane and the bony wall (see Figs. 1 and 2), which, under irritation, becomes engorged similarly to the erectile tissue of the inferior turbinated. The retention of the tears in a sac already infected by the inflammatory process from the nose, forms an ideal place for bacterial development and resulting inflammation, which, if not relieved, passes through the various grades of inflamma-

tory changes from a slight catarrh to a pyogenic condition, with or without involvement of the surrounding structures. It must not be forgotten that we encounter cases with swelling and tenderness over the sac which are entirely pericystic, a condition which may be due to an extension from an empyema of the antrum of Highmore or the ethmoid cells; the thickness of the bone in the immediate neighborhood of the sac often being papyraceous (as was demonstrated in the specimens presented), and there may be dehiscence.

In this connection I may call attention to the fact that some of the cases of suppuration of the lacrymal gland reported by the older authors no doubt were cases where pus had passed from one of the affected accessory cavities or even cranium into the orbit; pus from this source most frequently points at the inner canthus, but may also point over the region of the lacrymal gland. I have the records of three such cases. (See author's article, "The Sphenoid Cavity and its Relation to the Eye," ARCHIVES OF OPHTH., vol. xxv., No. 4.) Pus may enter the orbit from any one of the accessory cavities, even from the sphenoid, but the frontal sinus and ethmoid cells are the most frequent sources.

OPERATION AND TECHNIQUE.

I do not consider the extirpation of the lacrymal sac and gland an easy operation, if performed in such manner that we shall have primary union of each wound and no injury of adjacent parts. This is especially true of the sac.

Where the condition of the tear sac permits of it, I wash it out thoroughly (and also the nose) when the patient is being prepared for the operation, in order to eliminate as much of the infected matter as possible from the field of operation. The administration of an anæsthetic is absolutely necessary for the perfect performance of the operation, and everything pertaining to it must be carried out according to the latest rules of aseptic surgery. The patient's hair (which has previously been shampooed) should be enveloped in a moist towel. A strip of gauze is packed firmly up under the inferior turbinated over the exit of the

canal, to prevent the blood from passing into the patient's pharynx. The seat of operation is thoroughly cleansed, and to guard against reinfection the region of the tear gland is covered with borated vaseline and a pad of gauze held in place by two or three strips of rubber plaster, thus leaving the extirpation of the gland for the last, and thereby minimizing the danger from infection.

EXTIRPATION OF THE SAC AND CANALS.

In extirpating the sac, I do not think it best to open it if this can be avoided, but first try to hull it out as we would a cyst without rupturing. In order to more clearly outline the sac, I have in a few cases injected with a syringe through the slit canaliculi a thick starch, quite warm, and colored with iodine; then carefully withdraw the syringe, and close the canaliculi with small hæmostatic forceps. This may not succeed in all cases, for the starch under pressure will, if the duct is open, escape into the nose, or under manipulation in dissecting it escapes by the canaliculi. I hope to have a substance which can be injected say at 105° F., and rapidly cooled to body temperature by placing ice over the sac, at which temperature it should be of such consistency as not to escape by a small opening, and, if any escaped into the surrounding tissue through a rupture in the sac, it would not act as an irritant, but be absorbed.

By observing Fig. 3 we notice that, in order to avoid the arteries, we cut along the line indicated, which also corresponds with the centre of the membranous portion of sac. We also cut parallel with the muscular fibres of the orbicularis palpebrarum. By placing the point of the left index finger on the lower border of the bony orbit, one can readily trace the ridge extending upwards along the outer edge of the lacrymal groove in which the sac is imbedded (Fig. 10), until the tendo oculi is reached. We remember that the fundus of the sac rises to the *upper edge of, or slightly above, the tendo oculi.* Place the point of the knife at the centre of the lower border of the tendo oculi. The direction of the knife should not be directly antero-posteriorly, but should point

in the direction of the posterior pole of the globe of the opposite eye. We should carefully dissect through the skin and underlying tissue till the sac is exposed, which, as a rule, one can recognize readily, especially if injected, distended by secretions, or if the canal admits of passing a lacrymal probe. The lips of the wound must be held widely apart by small three- or four-pronged retractors, the field of operation cleared of hemorrhage, and then comes the difficult task of shelling the sac out of the lacrymal groove without tearing its coat, or opening any of the vessels found in the immediate neighborhood of the sac; especially is it difficult to avoid this in the fundus. It has been advocated to cut through the tendo oculi, beginning the incision about 2 *mm* above the tendon, in order to expose the upper end of sac and facilitate its removal. I have, however, in most cases been able to dissect out the sac from under the tendon, especially by the aid of my blunt hook made for this purpose. In cases where there has been extensive destruction of the sac, or its walls have become friable, one must cut the tendon or depend upon the curette. With care one can, in most cases, readily succeed in passing the blunt hook under the sac near its middle, after the manner of passing it under the tendon of the ocular muscles. This accomplished, the sac is easily and quickly freed down to its insertion into the upper end of the bony canal, from which it is cut off.

The bony canal is next thoroughly curetted, the instrument passing all the way through it, destroying the lining to the bone, with the object of favoring its filling up and becoming obliterated by healthy connective tissue. The wound is thoroughly cleansed by syringing, and then closed by deep and superficial sutures. If the tendo oculi has been severed, it must be replaced by one or two heavy stitches, so placed as to avoid passing the needle through the large blood-vessels surrounding this point. If we only extirpate the sac and do not destroy the canaliculi, there generally forms a blind pocket at the inner canthus, into which the secretion of the eye accumulates, keeping up an irritation. To avoid this I split the canaliculi throughout

their entire length, then place a flat platinum cautery point made to fit the cut surfaces, turn on the heat for a moment, sufficient to destroy all lining membrane and cause complete obliteration by granulation. Borated vaseline is placed over the wound, and a firm compress, shaped so as to make pressure over seat of sac, to favor ready adhesion of its walls, is held in place by adhesive strips, while we proceed to the second operation.

EXTIRPATION OF LACRYMAL GLAND.

I formerly shaved two-thirds of the eyebrow, and drew down the skin, so that while the incision was made along the margin of the orbit, the skin when allowed to recede brought the cut along the centre of the eyebrow, the object being to hide as much of the scar as possible in the eyebrow. (See Fig. 3.) The wound, however, leaves only a delicate scar, which soon fades entirely; while the eyebrows are of such slow growth that now I do not shave the brow, but make my incision below along the margin of the orbit (see Fig. 4), cutting against the bone, the incision beginning near the centre of the upper orbital arch, and, following the bony margin, it is carried to a point about 3 *mm* below the outer canthus; it will be seen from Fig. 5, where the course of the arteries and veins are outlined after Merkel, that we escape nearly all blood-vessels by following this line, so that hemorrhage, as a rule, is very slight. The fascia or septum orbitale (see Fig. 7) is cut through along its attachment to the orbital margin. It is at this point that confusion is likely to arise for the beginner. In the living, the resemblance between the orbital fat and the gland is sufficient to cause confusion (see Fig. 6), especially if the field of operation is partly obscured by hemorrhage. The normal color of the gland which authors speak of as rose-red, I have not encountered; those which I have seen were of a delicate pinkish yellow, especially by electric light (the source of illumination which I always use for operating in preference to daylight, as from an electric forehead mirror the operator can always inspect depressions and recesses otherwise in shadow). This wedge-shaped mass of fatty tissue, a pro-

longation of the orbital fat, and varying in size in different individuals and according to age, comes down from under the edge of the orbit between the layers of the lid. (See 4, Fig. 6, drawing made from dissection upon the fresh cadaver of a young adult; here it projected 4 *mm* below the orbital margin.) Should the fatty tissue present in the wound, it can be held to one side with retractors. Bleeding points from the edges of the wound must be controlled so as to leave a perfectly clear field for operation. The relation of the anterior edge of the gland to the bony margin of orbit varies slightly; in some the gland presents one to two millimetres below, but the most frequent position is two to three millimetres upward and backward from the edge of the bony orbit. There is a thin but distinct layer of fascia between the superior and inferior gland (see 10, Fig. 8), which hides the latter from view. Care should be exercised not to displace the orbital contents unnecessarily, or injure the levator palpebræ superioris, the superior or external rectus. The gland tissue is quite friable, and in order to be positive that nothing is left behind to invalidate the success of the operation, much care must be used in dissecting it out in its entirety. This is difficult at the end most deeply imbedded in the orbit, where the gland is very intimately connected with the orbital fat and connective tissue. The ducts upon the under surface of the gland also offer some resistance. By means of a slender, blunt-pointed pair of scissors, broad ocular fixation forceps, small abscess knife, and a pair of tenotomy hooks, one can with some patience dissect out the gland with but little change of its shape, thereby assuring the operator that the extirpation is complete.

If, in addition, we desire to remove a portion or all of the palpebral or secondary gland, a blunt instrument is passed through the palpebral fissure and the conjunctiva over the seat of the gland pushed by an assistant up into the wound, where the small nodular gland-masses mentioned above can be dissected out. I believe it best to avoid perforating the ocular conjunctiva, thereby lessening the danger of infection from the tear-sac wound. I have never encountered severe

hemorrhage, but that such may occur with total loss of the eye has been reported by Dr. H. Gifford, in the *American Journal of Ophthalmology*, 1889. I do not close the wound until all hemorrhage (excepting a slight venous oozing) has ceased. The wound is closed by two deep and three or four fine superficial silk sutures, covered with sterilized borated vaseline, gauze and cotton, and pad fixed with strips of isinglass plaster. Both wounds are then covered by a large pad of gauze and cotton, held in position by a roller bandage, unless there has been extensive suppuration of the tear sac with necrosis of bone. The dressing is not disturbed for three or four days, when some or all of the stitches are removed, depending upon the condition found.

CASES OF EXTIRPATION OF LACRYMAL SAC AND GLAND.

CASE 1. *History.* John Seyler, age nineteen. Eyes were normal until the age of twelve, when he contracted diphtheria, which was followed by naso-pharyngeal catarrh and double purulent dacryocystitis with excessive lacrymation. The nasal catarrh disappeared, and the tear-sac inflammation also improved, but there was never entire cessation of secretion, which was frequently aggravated by acute exacerbations. Slitting of canals, probing and syringing were resorted to at irregular intervals during the five years preceding the time when he was seen by the writer, who instituted two months of systematic and careful treatment, but without improvement. Thick muco-purulent secretion could be expressed from both sacs. There was a firm stricture in the left canal which could be forced but not kept patent. Right canal could not be passed. Patient had undergone so much suffering from probing, injection of strong astringents, etc., that he was anxious for an operation, especially since I had extirpated the lacrymal sac from his mother two years before, with relief of all unpleasant symptoms excepting lacrymation (the gland in her case not having been removed).

Operation. Dec. 12, 1891. Chloroform anæsthesia. The right tear-sac and gland were extirpated. No fever. Dressing removed on the third day. Union by first intention. The result was so satisfactory to the patient that he asked to have the left side operated, which I did Feb'y 21, 1892, with the same result as on the right.

CASE 2. *History.* T. N. Age forty-seven. Has suffered for years from purulent dacryocystitis and annoying epiphora, much aggravated by a severe form of chronic conjunctivitis secondary to the tear-sac infection. Exposure to wind, or light, as well as close application caused free lacrymation and difficulty in using the eyes. The primary cause of the tear-sac trouble was a severe inflammation of the naso-pharynx with extensive destruction of the septum, and soft palate; periostitis had completely obstructed the bony portion of the lacrymal canal, so that treatment by probing was out of the question. Patient when seen was suffering from chronic sepsis; continuous fever ranging from 99° to 101° F., which I attributed to hidden bone necrosis, probably involving one or more of the accessory cavities, a surmise which afterwards proved correct, when I opened the sphenoid cavity and removed a large mass of dead bone from the anterior portion of the body of sphenoid, this being followed by permanent cessation of the fever, which had lasted for over one year, and had been attributed to various causes, but chiefly "chronic malaria."

Operation. April 23, 1892. Ether narcosis. Total extirpation of both lacrymal sacs. The operation did not cause any elevation of temperature above that from which he was suffering by reason of the chronic sepsis mentioned above. *Union by first intention.* Stitches removed on the fourth day. Pus having ceased to enter the eye, the chronic conjunctivitis yielded readily to treatment, but the lacrymation continued very troublesome, until on May 3, 1894, I removed *both lacrymal glands.* Stitches removed on the fourth day. Primary union.

CASE 3. *History.* L. K. Age nine. Has suffered from double purulent dacryocystitis of long standing. There had been suppuration of both sacs, resulting in double fistulæ. Treatment restored the right sac to normal function, but the fistula continued until cured by dissecting out a triangular piece of skin around the opening and covering it with a sliding flap.

The left sac, however, failed to yield to treatment, and on April 11, 1895, I removed both *lacrymal sac and gland* on the left side. Through the fistulous opening denuded and roughened bone could be felt on probing, so that while the wound of the skin over the seat of the gland healed by primary union, there was granulation of tear-sac wound in the inner canthus (at the caruncle), delaying complete union about two weeks.

CASE 4. *History.* Mrs. M. McG. Age fifty-four. Chronic purulent dacryocystitis, left side. Had suffered from epiphora for many years. During the last four years sac would swell at intervals and pressure upon it cause evacuation of muco-pus. Had received treatment at various eye clinics with indifferent results. For one year she had had repeated attacks of acute purulent inflammation of the sac, each accompanied by pain, fever, redness, and swelling. A careful examination revealed a firm stricture with false passage through walls of sac, either due to ulceration or probing. She had suffered so much from probing, etc., that she asked if it were not possible to relieve her once for all by a thorough operation.

Operation. March 10, 1896. Ether narcosis. Removed lacrymal *sac and gland.* Primary union of both wounds.

CASE 5. *History.* Miss M. Age twenty-nine. Gave the usual history of mucocele of long duration, finally passing into acute purulent dacryocystitis; recurrent attacks; prolonged probing and syringing, and in one of the acute attacks spontaneous opening of sac. When she first came I found the external opening had closed, a puckering scar indicating former seat of fistula; both canaliculi had been slit; sac swollen and too tender to permit of examination. Chloroform was administered with the understanding that if the examination revealed the sac in such condition that treatment would be of no avail, I was to extirpate the gland and sac. A probe entered readily through lower canaliculus downwards, backwards, and outwards, liberating pus; the probe came in contact with denuded bone along lower margin of orbit, and extending upwards and backwards under the pulley of sup. oblique. The *sac and gland* both extirpated. The diseased condition of the pericystic tissue necessitated extensive curetting of granulation tissue, even partly involving the caruncle. In order to follow up the granulating cul-de-sac, I was obliged to cut the tendo oculi, so that the lower lid dropped down from the globe like a flap, necessitating deep sutures to replace it. Dressing removed on the third day. *Primary union.* Stitches removed on the fourth day. Fig. 3, shows appearance on the sixth day. The abscess mentioned above did not heal without some granulation and a slight discharge of pus from the conjunctival side of canthus, so that about four weeks elapsed before all irritation ceased.

CASE 6. *Status Præsens.* H. P. Age five. Child rachitic;

teeth black and broken down; chronic purulent dacryocystitis with fistula of sac, left side; complete adhesion of soft palate to posterior wall of pharynx; double otitis media purulenta, with total destruction of membrana tympani, and necrosis of ossicles in the right ear. (These were also extracted at the same time.) Hearing so defective that he had forgotten the few words he acquired at the age of two years, when all of these afflictions resulted from a violent attack of diphtheria.

Operation. February 19, 1897. Chloroform narcosis. Sac and gland extirpated. Primary union of both wounds. Notwithstanding his debilitated condition, suffering from severe nasal catarrh, double purulent otitis media, and having three distinct operations, to wit: tear sac, gland, and extraction of ossicles from middle ear; his temperature did not go above normal.

Case 7. *History.* C. K. Age thirty-five. Epiphora about twelve years. Nine years ago first noticed swelling of left tear-sac, which he could empty on pressure either into the eye or down into the nose; contents always appeared "clear and thick." The discharge never ceased, but was worse when he had a cold. He had undergone prolonged treatment, and came into the Cincinnati Hospital asking for radical cure. Being informed that his case might be cured by tedious and careful treatment, he at first refused, stating that he was a poor man who could not spare the time necessary, besides he had no faith in the ultimate success, as former treatment from good hands had failed to relieve him.

Operation. April 2, 1898. Chloroform anæsthesia. Gland and sac removed. The latter was much thickened. Healing by primary union. Dressing taken off on the third day. As an experiment, I did not remove the stitches till the eighth day; there was no reaction. On the tenth day the wounds in the skin had entirely healed, and the patient asked to leave the hospital. In two days he returned with a most violent coryza and slight tenderness and swelling over the seat of the sac. The wound of the skin showed no irritation, indicating that in all probability the infection was from the nose by way of the lacrymal canal. The inflammation not subsiding under antiphlogistic treatment, I reopened the cavity, evacuated a small quantity of pus, leaving a granulating wound. He passed from my care before the parts had healed.

This case illustrates the importance of control over your patient in extirpation of the sac until the wound is firmly healed, because

of its direct connection with the nasal cavity. The bony canal being thoroughly curetted and its walls not collapsing as do the soft tissues about the sac, there is a wide avenue through which upward infection may pass from the nose as long as the canal is not yet obliterated by connective tissue.

The sac in this case was less affected than any of the other cases, and the cystic tissue was normal, while in most others it was also inflamed, yet most of these cases healed by primary union. My only explanation is that they were all private patients who avoided exposure and remained under control until they were cured.[1]

Case 8. *History.* Mrs. M. Age forty-four. Gives history of having suffered from epiphora, mucocele, and acute purulent inflammation of the right sac for fourteen years. Was treated in New York by probing and syringing; carried a style for some time. After "two years of torture" further treatment was abandoned, the sac was opened, and an attempt made to obliterate it by the use of some acid, requiring long and painful treatment. The tears continued very profuse, blurring her vision, requiring constant wiping, and causing excoriation of the cheek at certain seasons. This condition had existed for the last four years. Being a woman of refinement, and a constant reader, the tearing interfered greatly, and she came to me asking for a radical cure.

Operation. February 19, 1898. Chloroform narcosis. *Removed the gland* and the undestroyed upper part of the sac. Primary union of both wounds.

In the cases so far operated upon, I had only removed the large gland, but not the inferior or palpebral gland. Their *complete* extirpation through the same wound is not always an easy proceeding, as in many cases they are very small and difficult to differentiate. In this case, after removing the upper gland, which was unusually large, I searched for and removed as many of the nodules of the secondary gland as I could find, thus making as nearly as possible a *complete* extirpation; my reason for doing this being that in one of the other cases (No. 2) the secretion from the inferior or palpebral gland is, when the eye is irritated, sufficient to cause some annoyance, and as in this case the upper gland was unusually large and lacrymation very profuse, I feared that if left undisturbed the secondary gland would secrete enough tears to become annoying.

[1] Since writing the above I have been informed that this patient came under treatment again for a syphilitic affection of the nose.

CASE 9. *History.* Prof. D. Age forty-eight. Patient gives history of suffering from affection of the left tear-sac since he was one year of age. During all that time the tear sac has passed through numerous attacks of inflammation, from slight to the most violent, resulting in perforation and a permanent fistulous opening. Passed through various treatments at different times, till he finally became discouraged, and of late years had left it alone.

On Nov. 22, 1897, he consulted me and asked for the radical cure.

Operation. March 23, 1898. Mixed anæsthesia. Extirpation of gland, but the sac was so diseased that it could only be made out in part. The skin over the sac was so friable and puckered by repeated inflammations that it became necessary to excise a portion of it. Through the excessive curetting necessary to bring away all of the diseased tissue, the lower lid became detached from its insertion at the inner angle and sagged away from the globe. Replaced by sutures; primary union, even over the sac, without any recurrent manifestations later on. (See Fig. 4 taken on the sixth day.)

CONGENITAL DISLOCATION OF TEAR GLANDS. EXTIRPATION.

CASE 10. *History.* Miss C. G. T. Age seventeen. Had always noticed slight fulness of skin over seat of glands. At the age of thirteen years, when menstruation began, the fulness over the glands became more marked, associated with varicosity of vessels. The skin over the swelling seemed thinner than normal; the tumor was soft, with tendency to bag; lying loosely within it one could feel the gland, which was of normal size; the lower half of it could readily be grasped between the fingers, and slight pressure caused it to slip from between your grasp and disappear under the roof of orbit. When patient was excited, or when exercising, dancing, or at the time of her menstruation, the swelling would become so engorged as to almost resemble a nævus, disfiguring her and causing comment. Tear sac and eyes normal. No abnormal lacrymation, but patient demanded an operation which would relieve her of the annoying symptoms described.

Operation. Oct. 23, 1890. Ether anæsthesia. Removed the *right gland* and excised a portion of the redundant skin. There was very free hemorrhage from the superficial vessels. Closed

wound with eight sutures. Dressing and stitches removed on third day. Primary union.

Dec. 9, 1890. The *left eye was operated upon in the same manner* as the right. Result perfect.

EXTIRPATION OF LACRYMAL SAC.

CASE 11. Mrs. F. M. Age thirty-two. Has suffered for years from muco-purulent dacryocystitis ; left side. Has passed through the usual lengthy seasons of probing ; a false passage with circumsacular abscess found.

Oct. 12, 1888, extirpated the sac under A.C.E. anæsthesia. Primary union.

CASE 12. Mrs. A. S., age forty, sister of the last-mentioned patient. Came with the usual history, asking for the same operation, which was performed on April 15, 1889. Chloroform. Primary union.

CASE 13. Eddie Boyer, age thirteen. Purulent dacryocystitis, with perforation of sac, left eye. April 30, 1893, extirpation of sac under chloroform. Primary union.

CASE 14. *History.* Mrs. N. McD., age eighty-four. One year ago, in Indianapolis, had been operated upon the right eye for cataract, followed by panophthalmitis and enucleation. Had a ripe cataract in the left eye. Being a woman who, mentally and physically, was wonderfully well preserved, she determined to try once more to regain sight. Functional examination of the eye favorable, but suffered from chronic catarrhal conjunctivitis.

Since losing one of my earlier cataracts due to infection from an unsuspected tear-sac trouble associated with ozæna, I never examine a case for cataract operation without a careful exploration of nose and tear duct and syringing of the latter as a test. Firm pressure by the finger failed to bring forth the least sign of secretion, but syringing brought forth a small quantity of thick yellow pus from the sac, which the microscope showed to be rich in strepto- and diplococci. Extraction under such conditions would likely cause a repetition of what had happened to the right eye. Probing and treatment were out of the question, as she neither could nor would submit to it on account of the pain.

Operation. October 14, 1896. Ether anæsthesia. Extirpation of sac. Primary union.

On account of her age I desired to shorten the operation, and

did not remove the lacrymal gland, as I thought any exposure causing tearing would be largely avoided in her case. The following six weeks were devoted to cure of the conjunctival inflammation. Dec. 2, 1898, made extraction with iridectomy. Final vision after discission was $\frac{20}{20}$ with + 10 D, and Sn. No. 1 with + 13 D. The only annoyance she has is tearing upon exposure, and had I the operation to do over again I should certainly remove the orbital gland.

RÉSUMÉ OF CASES.

BROUGHT UP TO MAY 15, 1898.

Reports of surgical cases may, at the time of the operation and immediately after, appear very satisfactory, and yet the good result be transitory, *time being the only valuable test.* I therefore re-examined all the cases (excepting No. 4, of whom I have lost track), and have placed them below in the order they were operated upon.

CASE 10. C. T. Double extirpation of dislocated glands in 1890. In response to my letter of inquiry, the following reply was received, which I take the liberty of quoting verbatim, as it expresses her feelings upon the subject uninfluenced by the doctor's opinions.

"CARTHAGE, KY., Apr. 4, 1898.

"MY DEAR DOCTOR:

"Your letter came this morning. In return will say that the operation was a perfect success. My eyes are entirely well. They have never given me the slightest trouble since the operation, and I am very grateful to you. Will be in Cincinnati very soon, and certainly call at your office.

"Yours very truly,

"C. G. T."

This patient presented herself about two weeks after writing the above letter, and was examined with the following result: the scars from the incisions are no longer visible excepting upon careful search. Varicose vessels and hyperæmic condition of the skin, which existed before the operation, have entirely disappeared.

Vision perfect, right and left, for distance and near. Recti muscles balance perfectly. Patient is unable to weep, but irritation of eyes by chemicals produces a *very slight* moisture from secondary glands, more in the right than the left.

Case 1. Extirpation of *both sacs and glands*, 1891–92. Re-examined April, 1898. (See Fig. 9.) Excepting upon careful examination, one fails to see line of incision. Eyes have never caused him any annoyance since the operation. Cannot weep, and only upon *marked irritation* is there slight amount of lacrymal secretion perceptible. Vision normal.

Case 2. Extirpation of *both sacs* in 1892, and of *both glands* in 1894. This is the only one of the cases where the operation has not given complete relief from tearing. Under strong irritation to the eyes, tears can accumulate in sufficient quantity to be annoying.

Case 3. L. K. Extirpation of lacrymal sac and gland in 1895.

Re-examined April, 1898. The right tear sac, a fistula of which was closed by skin flap, has remained normal. The left eye has been normal since the operation. Vision unchanged. When crying, the left eye becomes moist, but there is no overflow of tears, but free tearing from the right.

Case 4. Lost from observation.

Case 5. Re-examined April, 1898. Eye has been normal since she was discharged. Entirely free from epiphora; only strong irritation causes a perceptible moisture of globe. Vision of operated eye normal.

Case 6. Re-examined February 19, 1898. Eye normal since operation.

Cases Nos. 7, 8, and 9 are of special interest, because from Nos. 7 and 9 I removed, in addition to the large gland, some of the nodules making up the palpebral portion, and from No. 8 I removed all (or as much of it as I could find).

The eyes were carefully re-examined after the operation, in order to see what changes, if any, had taken place, with the object in view of determining if, in addition to the removal of the superior gland, the removal of all, or even a portion of the secondary or palpebral gland would still leave the eye sufficiently lubricated from the secretions of the mucous glands. In Case 8, on the sixth day after the operation, when my assistant, Dr. Vail, was testing the patient, he found that the vision, which before opera-

tion had been $\frac{20}{30}$, was only $\frac{20}{40}$. A careful examination of the eye revealed nothing abnormal excepting that one could detect a slight amount of mucus upon the cornea. He therefore flushed the eye with a normal salt solution, and found vision at once restored to $\frac{20}{20}$. It was very evident that while the eye received enough lubricating fluid to make it feel comfortable, there was an insufficiency of the watery solution to keep the mucus from adhering to the corneal surface. She was examined from time to time, and in two weeks the moisture had again become sufficient to keep the cornea clear of mucus, and vision was normal, no doubt due to the increased function taken on by a few nodules of the palpebral gland which escaped me, or increased action of the retrotarsal glands. This patient reported on June 1, 1898, by letter :

"LYONS FALLS, N. Y., June 1, 1898.

"My eye is a perfect success. . . . In behalf of suffering humanity surely the least I can do is to tell them to weep no more, but to obtain absolute relief by a radical operation."

CASE 9 gave the same result as above, but the return of sufficient moisture to keep the cornea free from mucus was much more rapid than in the former case ; and examination of the eye on May 26, 1898, found it normal.

The cases upon whom I performed extirpation of the sac only, 11 and 12, were also re-examined in April, 1898. There has never been any recurrent trouble from the region of sacs, but both suffer greatly from epiphora, especially in winter, and will probably have the glands removed in the near future.

In the preparation of this paper I dissected fifty anatomical specimens cut so as to demonstrate the accessory cavities, lacrymal canal, and turbinated bodies (preserved in Wickersheimer's solution or alcohol).[1]

I give the average measurements from all of these specimens, showing the relation of *the outlet of the nasal duct* to the lower edge of the inferior turbinated, the floor of the nose, and the entrance to the nares, as follows :

[1] These specimens were demonstrated at the Convention.

	GIVEN IN *mm*.		
	Greatest	Least	Average
Distance of outlet above floor of nose	22	9	16
" " " above the anterior insertion of inferior turbinated	10	1	6
" " " from anterior edge of nostril or labio-nasal junction (in the denuded skull it is about 15 *mm* less)	34	25	30
" " " above lower edge of inferior turbinated	14	3	10
Transverse distance between the inferior turbinated and wall of antrum of Highmore, at the point of greatest inward curvature of inferior turbinated (hardened specimens)	11	2	6

In three of the specimens in which the inferior turbinated is abnormally small, the outlet is 1, 3, and 5 *mm below the lower edge* of turbinated. In the hardened specimen, the outlet of canal is round or oval, but in fresh sections nearly always slit-like,—so fine that it is often difficult to find it by direct examination of a fresh specimen, especially if the mucous membrane is swollen. The canal may also open at the highest point under the inferior turbinated, or, as it frequently does, pass obliquely through the mucous membrane and come out from 1 to 10 *mm* farther down.

Bearing these points in mind, one can scarcely pay serious attention to the statements now and then seen, which speak glibly about probing the canal through the lower duct. Only in exceptional cases is that practicable. One thing is certain, that probing or use of syringe from below up must be gentle, for one can easily injure the membranous lips and cause adhesions.

Of the glands extirpated, the largest was from No. 8, length 30 *mm*, width 13 *mm*, greatest thickness 8 *mm*, weight 1.3 grammes. Sections were made, by Dr. H. C. Whitacre, from this gland (see Figs. 11 and 12). In Fig. 12, in which a simple lobule is shown, the central canal is well demonstrated. From it we can follow up the terminal duct with acini clustered about it.

SYNOPSIS.

The ages of patients ranged from five years to eighty-four years. As to sex, six were males, eight were females.

In three cases there was double extirpation.

Counting each side as one operation, we find 17 operations, 7 times upon the right, 10 times upon the left.

There was primary union over sac 16 times.

Wound over sac healing by granulation once (Case 7).

There were 13 extirpations of the lacrymal gland, with primary union in every case.

ADDENDUM.

In order to simplify matters for the student, it were better if only one instead of several names were used for each gland, as is the case at present, to-wit :

The larger lacrymal gland,	Superior	lacrymal	gland.
	Orbital	"	"
	Primary	"	"
The smaller lacrymal gland,	Inferior	"	"
	Secondary	"	"
	Palpebral	"	"
	Accessory	"	"

while the glands located in the loose cellular tissue under the conjunctiva along the upper edge of tarsal cartilage, to the number of about forty in the upper and two or more in the lower, are designated by the following names :

1. Glands of Krause.
2. Glands of Waldeyer.
3. Posterior tarsal glands.
4. Acino-tubular glands.
5. Accessory lacrymal glands (Henle).

I would suggest that the tear glands be designated as *superior* and *inferior*, and the others as the "*posterior tarsal glands*," their location being indicated by this name. Whether or not these glands should be classified as accessory lacrymal glands or as mucous glands appears to me not to have been positively determined as yet ; if accessory lacrymal glands, are they stimulated to activity by emotion, or by direct irritation of the eye ? Is their secretion identical with the tears, or modified ? I am not aware that any secretion which was *positively* known to come from the posterior tarsal glands has been analyzed ; *as most of these glands are only a fraction of one millimetre*, and none probably ever over *one* millimetre in diameter (Merkel), sufficient secretion for analytical purposes could only be obtained from cystic formation, and Dr. Stoewer, in *Klin. Monatsbl. f. Augenh.*, 1892, has reported the only indisputable case of "Cysts of the Glands of Krause" that I have been able to find, and, unfortunately, the

contents were lost through rupture of the cyst walls during the process of extirpation; but he describes them as cysts 4 and 5 *mm* in diameter, and, as well as could be noticed at the moment of rupture, their contents appeared as a thin, serous fluid. But whether the secretion from these glands under normal conditions is the same, is, I believe, still an open question. If their secretion is identical with that of the tear gland, it must be in very limited quantity, as proven in my cases of total extirpation by the absence of tears when the eyes were irritated, proving conclusively that the main, if not the entire, supply of tears is derived from the superior, and a variable but never large quantity from the inferior, lacrymal gland.

I certainly must take exception to the following statement in Roosa's text-book, 1894, page 12: "The lacrymal gland actually furnishes but a small portion of the tears, the conjunctiva furnishing most of them."

L. de Wecker (*Progr. méd.*, 1897, No. 47) reports a case where he extirpated the orbital gland without the slightest result. Later he extirpated the palpebral gland, when the epiphora ceased. The carefully observed results of my thirteen cases of *total* extirpation of the orbital gland certainly do not coincide with the result obtained in De Wecker's case. It stands to reason that, if we take two glands identical in structure and function, but one from ten to twenty times larger than the other, the stimulating cause being the same and equally exerted upon both glands, the larger gland must deliver a correspondingly greater amount of tears.

DECLINATION OF THE VERTICAL MERIDIANS OF THE RETINA.

By GEORGE T. STEVENS, M.D., Ph.D., New York.

IN the article entitled "The Directions of the Apparent Vertical Meridians," etc., which appeared in the Archives of Ophthalmology, No. 2, 1897, I treated the subject from the physiological standpoint mainly. In a brief article which appeared in the *Ophthalmic Record* somewhat later,[1] the more practical side of the subject was treated.

It can not be said, however, that any discussion of the subject of retinal declination from a practical point of view, and which is in any way commensurate with the importance of the subject, has thus far been made public.

It is with a view of presenting a few of the more conspicuous facts and more important deductions that this article is prepared.

In order to avoid confusion arising from the consideration of somewhat similar phenomena having their origin in entirely different classes of causes, it will be advisable at the outset to recognize two distinct classes of declinations: first, those which are the normal though irregular consequences of the peculiarities of development of the intra-orbital structures. Such peculiarities are, doubtless, often, if not generally, governed by the conformation of the bony walls of the orbits. These constitute a class of normal anomalies, dependent, so far as is known, on no disease or disability of any muscle or set of muscles.

[1] "Some New Methods of Examination of the Position of the Vertical Meridians of the Retinas," *Ophthalmic Record*, May, 1898.

Just as hypermetropia is a constitutional state of the eye, so these declinations represent the constitutional adjustment of the globe of the eye in relation to the technical primary position of the cranium.

The second class includes those tiltings of the retinal image which have long been recognized in connection with certain diseases or disabilities of the muscles of the eyes; as, for example, the tilting so conspicuous with paralysis of the superior rectus or the superior oblique.

Such tiltings, arising from any form of muscular disability, are as characteristically differentiated from the normal anomalous positions of the retinal meridians, as are the phenomena of diplopia in concomitant squint from those of paralytic strabismus.

It will, then, since the normal anomalous conditions are frequent, and those from disabilities rare, sufficiently classify the two groups if the first is recognized as *anomalous declinations*, or simply *declinations*, while the other group is called *pathological declinations*.

The first class, anomalous declinations not related to disabilities of the muscles, had, previous to my own contributions, obtained no recognition as a practical subject, if indeed it had been recognized at all, although it is probably one of the most practical of the various important phases of the adjustments of the eyes.

Aside from the crude, indefinite, and not always correct methods which were in vogue for ascertaining the tilting in cases of paralysis or paresis, and the entirely unreliable methods employed by physiologists to find what was the supposed position of the "apparent vertical meridians," no means for precise determination of the position of the meridians had been suggested previous to the introduction of the clinoscope. It is not too much to say that this new means of research has opened up a most important field of inquiry.

Leaving out of consideration the group of pathological declinations, this article will be devoted exclusively to normal anomalies, and the subject will be examined from the standpoints:

1. The general facts of retinal declinations.

2. The influence of declinations upon the eyes—the local influence.

3. The more general influences.

4. The more recent observations for determining the true measurements of declinations, and

5. The question of treatment.

GENERAL FACTS OF RETINAL DECLINATIONS.

Hypermetropia, was, before the era of Donders, regarded as a "weakness" of the eyes. Now it is known that the condition has no dependent relation to weakness or strength of any part of the eye. No more are the declinations, which we are about to consider, dependent upon the strength or weakness of any structure. They are anomalies in the sense that they are deviations from a rule which should prevail where the ideal conditions are present. They are anatomical peculiarities which vary from the typical state, but which are probably much more common than the typical state.

The vertical meridian of the retina is that meridian which, when the image of an upright straight line falls upon it, should give the impression of an exactly vertical straight line.

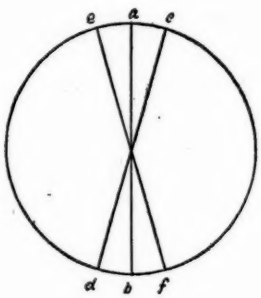

FIG. 1.

If, for example, the line *a b*, Fig. 1, is the vertical meridian, and occupies the exact vertical position when the head and body are erect, the image of a vertical line will fall upon this meridian. But if the eye is rotated on the optic axis so that the meridian occupies the position *c d*, the image of

the vertical line falls where it did before, but does not now coincide with the true vertical meridian, but with the meridian which previously occupied the position *e f*, and the image will appear to lean in the direction of *e f* and not in that of *c d*, which is actually occupied by the real vertical meridian.

If the distance *a c* = 5°, and if *c* is at the temporal side of *a*, then there is positive (+) declination of 5°.

The vertical meridian is selected for location simply for convenience—any other meridian would serve as well if it were equally convenient. The declination of one meridian from the typical position represents the variation of every meridian. Hence, when the position of the vertical meridian is stated, it indicates the relative positions of all other meridians.

In the typical state of adjustments of the eyes this meridian, when not directed elsewhere by voluntary effort, should, the head being exactly in the primary position, be precisely vertical.[1] As a matter of fact it seldom occupies this position.

A belief has hitherto prevailed among physiologists that there is, in healthy eyes, a fixed and definite position of the meridian which is universally prevalent. And it is interesting to note that each physiological observer, when by his experiments he has thought that he has located the position for his own eyes, has at once drawn the conclusion that that is the true position for all eyes.

This has led, of course, to various opinions, none of which was based upon correct data. The idea that there is a fixed and definite position for this meridian is no more correct than would be the idea that, because an observer should find a dioptre of hypermetropia in his own eyes, he should draw the conclusion that that is the type on which all eyes are constructed. There is as much variation in the position of the vertical meridian in different individuals as there is difference in the refractive states of the eyes of as many persons.

It was the failure to recognize this fact that led Helm-

[1] Stevens, ARCHIVES OF OPHTHALMOLOGY, No. 2, 1897. This is not the view that has prevailed, although some physiologists have entertained it.

holtz, when by crude methods he found that the vertical meridians of his eyes appeared to deviate from the true vertical position, to reason that what he observed in his own case must be typical for all, and upon the basis of this incorrect conclusion he constructed his remarkable mathematical demonstration of the horopter which no one else could confirm.

It may be assumed that there is a definite relation between the precise position of the insertions of the motor muscles of the eyes and the degree and direction of declination, but the necessity for much additional anatomical data before attempting to formulate the elements of the problem in a given case is apparent.

In general terms, however, it may be stated that anomalous declinations are the results of anomalous insertions of the motor muscles. It is no more to be expected that in every case the muscles will be so inserted into the sclera as to adjust the vertical meridian exactly vertically, than it is to be expected that all eyes will have the same length in proportion to the diameter.

With certain forms of the orbit there are certain characteristic and very pronounced declinations. When the orbits are quite symmetrical, it may be expected that the declinations, when existing, will be uniform; that is, if one is positive, the upper part of the meridian leaning outward, the other will also be positive. In other cases, when the orbits are not symmetrical, there is generally a want of symmetry of the declinations. Thus, the vertical meridian of one eye may be really vertical, while the other has a positive declination, or one may be negative and the other positive; in other words, the upper part of the meridian of one side leans toward the nose, and the other toward the temple.

In extent, the declination may be anywhere from a half a degree or less to many degrees. A declination of 4° or 5° is not at all uncommon, but it is rare to find such declinations for each eye in non-strabismic cases unless one is positive and the other negative.

As in refraction there are few, if any, eyes that are perfectly emmetropic, so there are few eyes which are abso-

lutely free from some measure of declination. Here we may draw another comparison. As in ametropia very slight anomalies may be disregarded and the eyes be considered practically emmetropic, in like manner a small extent of declination may be ignored. As the result of observations since the clinoscope has been brought into practical use, I have arrived at the conclusion that a declination which does not exceed a single degree for the two eyes may generally be disregarded. A declination exceeding a degree is not an immaterial condition. If, for example, there should be found a declination of 1° for each eye with the same sign, positive or negative, it appears to be of about the same practical consequence, to make a rude comparison, as .75 D. astigmatism for each eye.

As in the case of refractive anomalies, the higher the grade of error the greater the disturbance, as a rule, the same principle holds with declinations. But as in many cases of high grade of refractive error no definite evil results are observed, so considerable anomalous declination may be unattended by noticeable disturbances.

SOME OF THE LOCAL EFFECTS OF DECLINATIONS.

As indicated in the last remark, it does not follow that any noticeable disturbance must result from a declination of either high or low degree. That disturbing effects do very often result from such anomalies will be strikingly evident to anyone who will take the trouble to intelligently investigate the subject.

Locally there may arise the ordinary symptoms of asthenopia or such irritation of the conjunctival membrane as may arise from the action of the eyelids in aiding the ocular adjustments. In fact, many of the more common disturbances which are often associated with heterophoria may have their origin also in declinations. There are some conditions, however, attendant upon declinations which are more distinctly characteristic of these than they are of heterophoria. As a matter of fact, the conditions of heterophoria are themselves not unfrequently the direct results of declinations, and disappear when the declinations are corrected.

As an example of a heterophoric condition which may arise from declination, perhaps the condition most easy of analysis in this connection is that of exophoria.

Early in my studies of the conditions of heterophoria, the conviction that exophoria is often if not usually a secondary condition depending upon some more radical anomaly, became almost a certainty. In more than one of my contributions to the subject of heterophoria this view has been presented.[1] Strong confirmation of this view will be found in the following analysis:

Let us suppose a moderate case of exophoria with abduction in excess of 8°. Examining by the clinoscope there will, in a great majority of cases, be found a positive declination[2] for each eye. Let it be assumed that this + declination is 2° for each eye.

Now, in the adjustments of the eyes for binocular vision, indeed for any vision, the first instinct is to place the vertical meridian (which would of course affect all other meridians equally) in such a position as to coincide with the image of a vertical object. In using the two eyes, this is the first essential to receiving the different points of the image of an object upon corresponding points of the retina. In order then to correct this leaning out of both vertical meridians, the eyes must be rotated upon the optic axes. In this case the rotation is accomplished principally by the superior oblique muscle. Hence, this muscle of each eye is brought into action disproportionate to that of other muscles.

The action of these oblique muscles is not simply that of rotation on the optic axis. Each muscle not only rolls the eye on the axis, but it turns it down and out. The downward motion, if the declination is equal, will be equal for the two eyes and will cause no hyperphoria, but the outward movement is decided for both eyes and must of necessity give rise to exophoria.

The fact that a condition of exophoria can be thus induced,

[1] See, among other articles, ARCHIVES OF OPHTHALMOLOGY, 1889, page 378 *et seq.*

[2] In the system of *declinations* a leaning of the superior extremity of the vertical meridian towards the temple of the same side is *positive* declination, while a leaning towards the nose is *negative.*

not of necessity by any disproportion in the rotating ability of the internal and external recti, will at once explain what must have been the disappointing experience of every surgeon who has often operated for exophoria, that a disabling of the rotating power of the external recti far out of proportion to the degree of exophoria has been required for even a temporary relief from the exophoria. The relief is indeed temporary, for in a majority of cases, unless the externi have been practically and permanently disabled for rotation, the exophoria returns in about as high a degree as before. And why should it not? It was not originally caused by the superiority of the externi over interni, but by the over-action of the oblique muscles, an over-action which remains after disabling the externi.

It is unnecessary in this connection to enter upon the consideration of the details of other forms of heterophoria in their relation to declinations, but these general rules, to which there are some exceptions, may be mentioned:

1st. That, with exophoria, nearly symmetrical positive declination or nearly symmetrical negative declination is the rule. With the class of cases most commonly met with in this country in private practice, the negative form is rare.

2d. With esophoria, the rule is that there is positive declination for one side, and negative for the other.

3d. While hyperphoria is more frequently an original state than esophoria, and still more frequently original than exophoria, it is, especially in low and moderate degrees, often a manifestation of the tensions arising from declinations. It is in such cases found in connection with declinations which are quite unequal in degree in the two eyes, as, for example, where the declination of one eye is 0°, and of the other + 3°.

By taking into consideration the very important conditions anophoria and katophoria in connection with the declinations of the meridians, the phenomena of converging and of diverging strabismus may be explained in a rational manner. It is not the purpose of this paper to discuss the general subject of strabismus, but in passing it may be stated that one who has a clear understanding of the normal

actions of the various motor muscles of the eyes may, keeping the above rules in mind, without more difficulty than attends the solution of any problem with several elements, account for the various forms of concomitant squint from these two factors, declination and ano- or kato-phoria.

That, in forms of adjustment of the eye in which those muscles which surround it almost like a band are held at an abnormal tension, there should under certain circumstances result a loss of the normal sphericity of the globe is quite to be expected. That the elongation of the globe in myopia is the result of a pressure of the eye muscles upon the globe has been the opinion of many eminent thinkers. While one class has thought that the tension from the correction of exophoria is sufficient to account for the change of form, another class has thought that the direction of the course of the oblique muscles afforded a better explanation.

It may well be thought that the constant pressure brought to bear by both the oblique and straight muscles in marked cases of declination may influence the form of the globe, but there must be a combination of circumstances to induce such a result.

In the first place, the scleral walls must be in a plastic condition. Such a condition may be one of the reactions from the tensions of heterophoria. A reddening of the conjunctiva or of the borders of the lids very frequently tells of the tensions of heterophoria, and the sclera may suffer a change of nutrition in the same way. When the eye is in this plastic state and the tension of the muscles which encircle it is much too great, there is every reason to expect the eye to yield to the pressure. Myopia is a progressive disease. If, with the first indications of the elongation of the globe, the conditions which induce hyperæmia and which cause unfavorable pressure are removed, a very rational expectation may be entertained that the farther progress of the elongation of the globe may be arrested.

One of the most characteristic local effects of declinations is the amblyopia which is in many cases associated with it. Such amblyopias are found in high degrees of heterophoria, in strabismus, and in high grades of astigmatism. It is

probable that even in these the defective vision is to be attributed in large degree to the declinations.

It is not proposed to mention the many forms of disturbance of the eyes which may result from anomalous declinations, and those already mentioned will suffice as suggestions of the general manner in which these defects may act.

GENERAL EFFECTS OF DECLINATIONS.

Coming to the more general effects of declinations, without entering upon details, it may be said that many of the nervous reactions which result from heterophoria may also have their origin in the normal tiltings of the meridians. Vertigo, for example, is one of the most characteristic of the neurotic symptoms arising from declinations, and that highest manifestation of the vertiginous condition, epilepsy, finds perhaps its most important factor here. That surprisingly good results have followed the correction of refractive errors and heterophoric anomalies in the treatment of this affection is, doubtless, in some measure at least, due to a removal of some of the complicating effects of declinations. With the removal of the declinations themselves even a greater measure of success can be expected, and this expectation is already being realized. In a number of instances in which improvement had resulted from the treatment of heterophoria, but in which a complete cessation of attacks had not occurred, since attention has been directed to the declinations the attacks have entirely ceased during periods long enough to make it sure that the controlling element has at length been reached.

From these examples it will be seen that the influences of these unfavorable adjustments are not only varied but of great importance. Much could be said in detail, but to those who are already familiar with the results of heterophoria these suggestions will be sufficient.

THE MORE RECENT OBSERVATIONS FOR DETERMINING THE TRUE MEASUREMENTS OF DECLINATIONS.

The clinoscope, as described in this journal in the article already referred to, was soon found to be in certain respects

imperfect. For example, with the tubes open at the proximate ends there was a possibility, and even a probability, that the head of the observer would not be held in the exact primary position. With a leaning of the head only a few degrees toward one side or the other, the determination of the position of the vertical meridians was vitiated. To remedy this, the tubes were supplied with discs with very small stenopaic openings exactly at the equator, and these

FIG. 2.—The Improved Clinoscope.

openings were so movable in the lateral direction that they could be adjusted to any pupillary distance. By means of a spirit level, the instrument could now be so placed that when the eyes looked through these very small openings they must of necessity be exactly in the same horizontal plane. This assured the technically exact position of the head. Other accessories were added to make sure that the head is erect in respect to any forward and backward lean-

ing, and still other modifications rendered the instrument more practical. As finally completed, it is figured in the accompanying cut. (Fig. 2.)

Only a single diagram is needed for general practical use; that is adjusted with minute accuracy and is made permanent.

The desire to introduce an instrument which would involve less expense led to the construction of the "lens clinoscope" which was described in the *Ophthalmic Record*, May, 1898, and the figure of which is reproduced here. After some refinements in the construction I find it a useful instrument in a class of cases in which the clinoscope is of little service. This is the class of amblyopics, from disease or strabismus, who fail to see the delicate lines of the clinoscope, but who will recognize the position of the lines in the lens clinoscope.

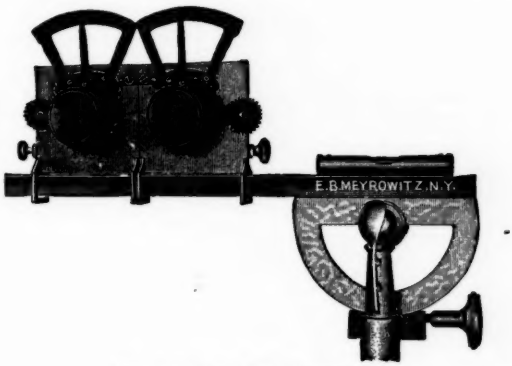

FIG. 3.—The Lens Clinoscope.

For very precise determinations it cannot always be relied upon. If the line of sight is precisely along the axis of the lens, the image is seen in its real position; but with a lens of 30 or 40 dioptres, a slight deviation of the line of sight from the lens axis must be attended by a declination of the image. By elongating the stenopaic opening to a tube of a few millimetres in length, this objection is largely removed, but at the expense of the length of the lines. The lens clinoscope is an excellent auxiliary instrument, but can

not yet supersede the clinoscope, which in its nature is free from any possible optical defects.

I also devised and, simultaneously with a colleague, described and figured an instrument in which a series of glass rods was used before each eye to give, behind the prisms of the phorometer, two parallel streaks of light. The very conspicuous optical defects necessarily incident to such an instrument, as well as the absence of means to maintain even approximately the proper position of the head, which is so absolutely essential, led to the abandonment of any attempt to perfect the instrument.

SOME SUGGESTIONS ON THE USE OF THE CLINOSCOPE.

The results to be found by the help of the clinoscope, to be of value, demand on the part of the investigator much care and judgment. Like the microscope, the clinoscope can show a good many things which do not exist except in the mind of the observer. This is no argument against the use of either. Without attempting to lay down any precise rules, a few general suggestions will not be out of place here.

In order to obtain exact results, the two optic axes must be in the same horizontal plane. If the instrument is exactly levelled and the two eyes see simultaneously through the pin holes, the eyes must of necessity be in the required position. The surgeon should therefore in all cases where it is practicable assure himself that both parts of the haploscopic figure are seen at once. In high degrees of strabismus this is not practicable, and he must use every precaution that the head does not change position in changing the eyes. At the first examination many persons fail to decide correctly as to the position in which lines are vertical. The examination should be continued a few minutes, the examiner changing the position of the lines little by little until the patient has had some practice. Let one half the figure be located first, then the other. It is not every patient who can unite the parts of the figure at first. If not, it is better generally not to use a prism for uniting, as each part can be located separately.

It is best that the patient should not handle the rotating screw-heads himself, since the muscular sense of the hands and arms is strongly suggestive to the eyes, and the eyes should have no extraneous assistance. The body should be perfectly erect and the hands passive. Not until the examination on the third or fourth day should the surgeon accept as unqualified evidence the belief of the patient as to the position of the lines. By the second or third day most patients have learned to be very correct. Unless the conditions are notably pronounced and the tests very uniform, examinations which are expected to be followed by operations, either for heterophoria or declination, should be continued more than three or four days. No suggestion as to the real position of the line should be made to the patient during examination, and he should hold the eyes at the instrument, and very close to it, until the locations of surrounding objects are, so to speak, forgotten by the eyes.

THE QUESTION OF TREATMENT.

This must be considered in connection with the treatment of heterophoria if it exists, or of the conditions of anophoria or katophoria should either be present.

It may be said in the beginning that, except where strong refractive glasses are to be used, lenses do not correct declinations. Very strong convex (or concave) glasses, if badly centred, will cause declinations, and if these declinations happen to be in the right direction they will neutralize the retinal declinations which are normal to the eyes. In certain cases of strabismus, strong convex lenses, by acting as prisms, with their bases up and down, and by neutralizing to a greater or less extent the declinations, will serve as temporary aids in keeping the eyes nearly parallel. This effect of glasses has been the strongest argument in favor of the doctrine of the relation between hypermetropia and strabismus.

Such a neutralization, it is very evident, must in the nature of the case be extremely rude and unsatisfactory even where strong glasses are demanded. Prisms are of no direct service. So far as the symptoms of heterophoria are relieved

by prisms or decentred glasses, the eye muscles are rested, and if only one element of the defect remains, it is more easily managed than when there are more than one.

If operations are to be done for heterophoria, much can often be done at the same time for the correction of declination. The same may be said, but with greater emphasis, in regard to anophoria or katophoria.

Let a case be supposed in which, with positive declination for each eye, there is, as shown by the tropometer, upward rotation of 40° of arc, downward of 42°. It is not only safe but very often desirable in such a case to reduce the upward rotation and add to the downward rotation. Should this be determined upon, and should 5° (prism = $2\frac{1}{2}$° of arc) be the extent of relaxation desired, a tenotomy may be done on the insertion of each superior muscle, carrying the section to the extreme inner border of the insertion but sparing the ultimate fibres, while a considerable bridge of the outer portion of the tendon insertion remains untouched. By such an operation the desired relaxation of the superior rectus can be obtained, and a declination as high as 4° or 5° may sometimes be corrected. It is unnecessary to add that such an operation demands a good deal of care and skill.

On the same principle operations for hyperphoria, esophoria, or exophoria may be combined with the correction of declination.

It should be remembered, however, that in many cases of heterophoria the correction of the declination carries with it the correction of the heterophoria.

If the operative correction is to be for the declination only, it can be done by either of the two methods which I have already described in the *Ophthalmic Record*.[1] The first is by the method which I have called *peritenotomy*, which may be *lateral* or *vertical*.

In doing lateral peritenotomy for a positive declination, the internus is relaxed at the *lower half* of the insertion, carrying the separation up to the centre and down to the ultimate fibres at the lower border. An exactly similar relaxation is done at the upper half of the externus.

[1] May, 1898.

If it is desired to obtain a considerable effect, the insertion may be separated a little above the middle of the inner rectus and a little below the middle of the external, but such relaxations should be made with the greatest care lest the lateral rotation either in or out should be restricted.

On the same principle, peritenotomy may be done on the vertically acting muscles: *vertical peritenotomy.*

The other method is by contraction of the half or two thirds of one tendon and the half or more of the other diagonally opposite of the opposite tendon. This operation, *circumtraction, lateral* or *vertical,* may be made to accomplish more than the method of peritenotomy, but it has the great disadvantages of all advancements, the uncertainty of the ultimate effect, the swelling and irritation during healing, and the thickening and adhesions at the point of operation.

In cases in which very pronounced results are sought this is the more effectual method, but a method to be avoided when small corrections are looked for.

EXPERIMENTS ON THE GERMICIDE PROPERTIES OF CERTAIN EYE SALVES.

By ROSA WELT STRAUS, M.D., Brooklyn.

THE following experiments were made with the salves used in the Ophthalmic Clinic in Berne (Switzerland). I examined only those salves which were supposed either to restrain or arrest the development of bacteria; others in use there, containing atropin, eserin, etc., were not examined. The work was done in the Bacteriological Institute in Berne.

I experimented with:

Vaselinum album purissimum,
Acid. bor., 4 %
Hydrarg. oxid. flav., 2 %
Airol, 5 % and 10 %
Aristol, 5 % and 10 %
Iodoform, 5 % and 10 %
Thioform, 5 % and 10 %, and
Iodon, 5 % and 10 %
Iodia,[1] 5 % and 10 %

The two latter, though not in use for the composition of eye salves, (and whose cauteric qualities make it doubtful whether they can be thus used at all,) were added on the wish of Prof. Tavel, who was at the time experimenting with them. All the salves examined were prepared with the pure white American vaseline. They were examined with regard to their action on

Pyocyaneus
Staphylococcus aureus
Bacterium coli.

The experiments were made in two ways:

I inoculated nutrient agar in Petri's dishes with pure cultures of the bacteria mentioned above. The inoculation

[1] I translate the German word Iodin by iodia, to distinguish it from the English iodin.

was done by means of the platinum needle, drawing it over the surface of the agar in a longitudinal direction; over this line and all around it a layer of salves was spread so as to completely cover the line of inoculation, but leaving a ring of uncovered agar all along the edge of the dish. It was then noted whether the cultures developed at all, and if so, whether they developed only below the salve or spread to the uncovered ring of agar, or if they developed only there, and in how many days.

I. Following Koch's method, silk threads, cut into pieces of about 1 *cm* in length and then sterilized, were introduced into bouillon, which, after having been sterilized, had been impregnated with bacteria culture-solutions (Bacterien-aufschwemmung). Pure cultures four days old were used for this purpose. In this bouillon the threads were left from four to six hours, were then taken out, and dried in the desiccator. Of these now thoroughly dry and infected threads, some were preserved in a sterilized dish to serve as comparison threads (Controlfaden), the others were imbedded in the various salves, eight to ten threads for each salve. They were removed from the salve successively after one, two, four, and eight days, one at a time. This one was lifted out of the salve with the sterilized platinum needle, and the salve was carefully removed by means of petroleum ether (Prof. Tavel's method). This was very satisfactory, and I encountered none of the difficulties which Bach [1] describes. It was done in the following manner: The thread was removed from the salve with the carefully sterilized platinum needle; was introduced into an empty sterilized test-tube; the petroleum ether was poured in, the cotton plug replaced, and the tube well shaken for about half a minute. With the loop of the sterilized platinum needle the thread was then extracted and put into a test tube containing nutrient liquid gelatine. This was gently shaken, so as to avoid the formation of air bubbles, was then placed in a nearly horizontal position, and when the gelatine had stiffened was placed in the gelatine-incubator (Gelatineschrank) to be examined daily during a week.

[1] Bach, Ludwig, *Arch. für Ophthalmologie*, 1894, Bd. xl., Abtheilung 3.

The threads which had been put aside in order to serve for comparison were treated with petroleum ether in exactly the same manner as before, being immersed in the gelatine.

The following tables show the result of these examinations:

TABLE I.

INOCULATION ON AGAR IN PETRI'S DISHES.

	Pyocyaneus.	Bac. Coli.	Staphylococcus aureus.
Comparison threads.....	g. m. col.	g. m. col.	g. m. col.
Vaseline.....	g. m. col.	g. m. col.	g. m. col.
Bor., 4 %.....	g. m. col.	m. col.	m. col.
Hydrarg. oxid. flav., 2 %.	m. col.	———	v. few col.
Airol, 5 %.....	g. m. col.	few col.	g. m. col.
Airol, 10 %.....	few col.	few col.	g. m. col.
Aristol, 5 %.....	g. m. col.	g. m. col.	m. col.
Aristol, 10 %.....	g. m. col.	g. m. col.	g. m. col.
Iodoform, 5 %.....	g. m. col.	m. col.	v. few col.
Iodoform, 10 %.....	g. m. col.	———	v. few col.
Thioform, 5 %.....	m. col.	g. m. col.	few col.
Thioform, 10 %.....	few col.	g. m. col.	few col.
Iodon, 5 %.....	v. few col.	———	———
Iodon, 10 %.....	———	———	———
Iodia, 5 %.....	———	———	———
Iodia, 10 %.....	———	———	———

g. m. col. = great many colonies (200 and more).
m. col. = many colonies (about 50 to 100).
few col. = few colonies (about 20 to 50).
v. few col. = very few colonies (less than 25).
——— = no colonies.

II. Inoculated silk threads imbedded in salves and, after removal of fat, immersed in gelatine. The experiments were repeated wherever the result seemed doubtful. Liquefaction was stated only where the microscopic examination proved the presence of bacteria. I often observed partial liquefaction resulting from the presence of certain ferments; this kind of liquefaction was not mentioned here.

The development of colonies on the comparison threads was always very slow, taking place from one to eight days later than on threads having been imbedded in salves; this I supposed to result from the evaporation and consequent dryness of the germs.

The tables could not be rendered here in extenso; they prove the interesting fact, that the development of bacteria

TABLE II.

PYOCYANEUS.

Number of days the threads remained imbedded in salve.	Comparison threads.	Vaseline.	Bor. 4 %	Hydrarg. oxid. flav. 2 %	Airol. 5 %	Airol. 10 %	Aristol. 5 %	Aristol. 10 %	Iodoform 5 %	Iodoform 10 %	Thioform. 5 %	Thioform. 10 %	Iodon. 5 %	Iodon. 10 %	Iodia. 5 %	Iodia. 10 %
1	g. many col.	g. many col.	many col.	m. col.	m. col.	m. col.	g. m. col.	m. col,	m. col.	m. col.	g. m. col.	g. m. col.	—	—	—	—
2	m. col.	m. col.	m. col.	m. col.	m. col.	m. col.	g. m. col.	g. m. col.	—	—	m. col.	m. col.	—	—	—	—
4	m. col.	m. col.	m. col.	—	m. col.	m. col.	m. col.	m. col.	—	few col.	m. col.	m. col.	—	—	—	—
8	few col.	m. col.	m. col.	—	few col.	—	m. col.	m. col.	—	—	3 col.	—	—	—	—	—
14	—	m. col.	—	—	2 col.	—	—	m. col.	—	—	—	—	—	—	—	—
COLI.																
1	g. m. col.	m. col.	g. m. col.	few col.	m. col.	m. col.	g. m. col.	m. col.	1 col.	1 col.	m. col.	g. m. col.	m. col.	m. col.	—	—
2	m. col.	m. col.	m. col.	few col.	few col.	few col.	m. col.	few col.	1 col.	few col.	g. m. col.	m. col.	few col.	2 col.	—	—
4	m. col.	g. m. col.	few col.	3 col.	few col.	few col.	m. col.	few col.	2 col.	—	m. coi.	few col.	5 col.	—	—	—
8	few col.	few col.	—	—	1 col.	v. few col.	m. col.	few col.	—	1 col.	4 col.	3 col.	4 col.	—	—	—
14	few col.	few col.	—	—	—	1 col.	v. few col.	v. few col.	—	—	1 col.	7 col.	1 eol.	—	—	—
STAPHYLOCOCCUS AUREUS.																
1	g. m. col.	g. m. col.	g. m. col.	m. col.	m. col.	m. col.	m. col.	g. m. col.	m. col.	m. col.	g. m. col.	g. m. col.	no. col.	no. col.	—	—
2	m. col.	g. m. col.	g. m. col.	—	m. col.	m. col.	m. col.	m. col.	m. col.	m. col.	g. m. col.	m. col.	m. col.	few col.	—	—
4	m. col.	g. m. col.	g. m. col.	—	m. col.	few col.	m. col.	m. col.	few col.	few col.	g. m. col.	m. col.	few col.	1 col.	—	—
8	m. col.	m. col.	3 col.	2 col.	few col.	few col.	m. col.	m. col.	—	5 col.	m. col.	m. col.	v. few col.	—	—	—
14	1 col.	few col.	—	—	—	—	m. col.	m. col.	—	—	m. col.	m. col.	—	—	—	—

is diminished as well as retarded in direct proportion to the duration of the exposure to the action of the salves. For instance: pyocyaneus in airol 10%; thread imbedded in the salve one day: second day of examination, a great many colonies; third day, complete liquefaction of gelatine, which appears intensely green; thread imbedded in the salve four days: many colonies on the fourth day; liquefaction on the eighth day; thread imbedded eight days: gelatine intact after eight days, etc.

I arrive at the following conclusions:

Most of the salves here examined diminish the vitality of bacteria, but act as germicides only after days of continuous application. Though all these salves had been prepared with the same constituent (vasel. alb. purissimum), their efficiency differs greatly according to the remedy used, as is shown by the tables; the choice of the antiseptic agent appears of great practical importance, as is not only that of the excipient.[1]

According to their antiseptic value, I should arrange the salves here examined in the following order, beginning with the most effective, and ending with those that showed very slight or no germicide properties:

Iodia, 5% and 10%	Bor., 4%
Iodon, 5% and 10%	Thioform, 5% and 10%
Hydrargyrum oxid. flavum, 2%	Aristol, 5% and 10%
Iodoform, 5% and 10%	Vaselinum alb. pur.
Airol, 5% and 10%	

The use of salves as vehicles for antiseptic remedies, as now extensively introduced, cannot be highly enough recommended. A prolonged if not continuous action of these antiseptics on the germs cannot be otherwise insured.

Experiments on germicide properties of eye salves were published by Weeks,[2] and by Bach.[3] The conclusions reached by the latter, as well as myself, seem to prove that salves restrain, and on longer exposure prevent, the development of bacteria.

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[1] *Breslauer Zeitschrift für Hygiene*, Bd. xx., pag. 195–197.
[2] Weeks, ARCH. OF OPHTHAL., xvi., 1887, p. 375.
[3] Bach, L., *Arch. für Ophthalmol.*, Bd. xl., 1894, Abtheil. 3, pag. 130–220.

HOLOCAIN IN OPHTHALMIC SURGERY; ITS SUPERIORITY OVER COCAINE; ITS THERAPEUTIC VALUE.

By HASKET DERBY, M.D., Boston.

THE new local anæsthetic, holocain, to which the writer called attention more than a year ago (*Boston Med. and Surg. Jour.*, June 3, 1897), has not yet come into very general use, judging from the little reference made to it in the medical press, as well as the indifference manifested by so many of those who have become habituated to the employment of cocaine. Believing as I do that the latter drug is in many important respects distinctly inferior to holocain, and having used the new agent almost exclusively for the past sixteen months, I have thought that a brief record of my own personal experience might not be without value.

In the operation for the extraction of senile cataract it is a most efficient anæsthetic. While not superior to cocaine in its superficial effect, it undoubtedly causes a greater degree of insensibility of the iris. Where a simple extraction is not performed and an iridectomy has to be done, we are all familiar with the start the patients may give, as well as the pain they complain of, at this stage of the operation. Under holocain, applied after the corneal cut has been made and the anterior chamber evacuated, it is my experience that the iris very generally allows itself to be seized with the forceps and excised without much if any suffering. This is a very great practical advantage. In connection with the operation of extraction, however, it is but fair to remark on the fact that the holocain does not control hemorrhage as cocaine does, and that where the latter agent is

not used we are liable to meet with a troublesome amount of bleeding.

For the removal of a foreign body from the cornea, holocain is decidedly preferable to cocaine, as it neither affects the accommodation nor enlarges the pupil, thus rendering its use possible in the case of people with a tendency to increase of ocular tension. In other operations on the cornea or iris, such as that of Saemisch for ulcus serpens or iridectomy for glaucoma, it is a well known fact that a degree of inflammation that prevents the absorption of cocaine will often yield to holocain, thus rendering the use of ether or chloroform unnecessary. Had cocaine alone been at our command, general anæsthesia would have been the only resort.

In the various operations on the muscles of the eye, no local anæsthetic has been found to give entire satisfaction. It can only be claimed for holocain in this connection that it is at least as efficient as cocaine, and can be used in cases where distressing constitutional symptoms have been produced by the latter.

In probing the lacrymal passage I still make a preliminary injection of cocaine, the poisonous effects of holocain, when administered internally, rendering it unsuitable for such a purpose. For the same reason no subcutaneous injection of the drug can be made. But in the numerous cases where I have used it locally and superficially I have never seen the slightest general disturbance.

To sum up, then, the advantages of holocain over cocaine:

1. It does not cause mydriasis, and may therefore be used without danger of bringing about increase of tension.

2. It does not affect the accommodation.

3. It brings about a greater degree of anæsthesia of the iris than does cocaine.

4. In cases of severe and painful inflammation which resist cocaine, holocain often proves efficient.

5. Unless swallowed or injected subcutaneously it produces no constitutional effects.

6. It has no effect on the corneal epithelium.

7. It is strongly bactericidal in its action.

Per contra, cocaine distinctly reduces the tendency to

hemorrhage, and it can be injected into the lacrymal sac, and often subcutaneously, with comparative impunity.

Such being the facts, it would certainly seem that, in the great majority of cases, holocain should supersede cocaine as a local anæsthetic in ophthalmic surgery.

A single word in regard to eucaine, which has also been proposed as a substitute for cocaine. My opinion of its efficiency is based on the following occurrence. I had operated in January of the present year on a lady of eighty for the extraction of cataract. Holocain was used, and the operation passed off well, causing little or no pain. A month ago I undertook to remove the cataract on the second eye. My nurse, a graduate of the Infirmary Training-School, had been used to cocaine, and had never seen anything else employed at an extraction. I was pleased to be able to call her attention to the advantages of holocain, and promised her a proof of its anæsthetic value on the present occasion. Greatly to my mortification, as well as astonishment, the patient complained bitterly of the pain, and asked me after the operation why it hurt so much more than it did the first time. On my reaching home the mystery was explained. I had taken by mistake a bottle of a two-per-cent. solution of eucaine B, and had not noticed the substitution until my return.

But I have found a possible use for holocain that, as far as I am aware, has not yet been adverted to. It is based on its bactericidal properties, which were so carefully investigated by Heinz and Schlösser (*Klinische Monatsblätter*, Jahrg. xxxv., S. 117).

If the immediate cause of corneal ulceration is, in accordance with the present theory of suppuration, the invasion of the territory by micro-organisms (Fuchs); if the ulcus serpens arises through infection of the cornea by organisms which give rise to a purulent inflammation (Fuchs); if so severe a remedy as the actual cautery has sometimes been efficient in bringing about a cure, why may not germicidal action be induced through milder means than the application of a high degree of heat, or the clumsy and roundabout method of the subconjunctival injection of corrosive sublimate?

"On the development of bacteria," say Heinz and Schlösser (*loc. cit.*), "holocain exerts an energetic restrictive influence. A 0.1 per-cent. solution plainly retards putrefaction and fermentation; a half-per-cent. solution prevents any development of bacterial germs; multiplying fission fungi are killed by a one-per-cent. solution. One-per-cent. holocain is therefore an active antiseptic."

The use of holocain in ulcers of the cornea seemed to be sufficiently indicated by the foregoing, and I began to employ it during the past year. My observations have been limited in extent, but thus far they have gone to convince me that holocain has a therapeutic value previously unsuspected.

A middle-aged man, in good health, had been for three weeks under my care for progressive corneal ulcer. He had used pilocarpine, cocaine, atropine, fomentations, and the compressive bandage without benefit. The pain had become excessive and the process had begun to take on the character of an ulcus serpens. I had begun to entertain thoughts of Saemisch's operation or the application of the actual cautery. I applied holocain, which I had never before used in a similar case, with the idea of relieving the nocturnal pain. Employed at first in connection with the other remedies, it was finally used alone, an immediate improvement seeming to follow its application. In the course of ten days the cornea had almost entirely cleared and the patient was discharged. There has been no relapse.

Another patient, also a man of middle age, had been under my care since December 10, 1897, with small corneal ulcers. These were peripheric, involved but slight loss of substance, but were extremely painful and very obstinate, yielding but slowly to treatment and constantly recurring. Finally, June 12th, I applied holocain to relieve the pain. Three days later the patient was well. At a subsequent attack, he himself applied cocaine, with the result of distinctly aggravating all the symptoms. Holocain was then substituted, and the attack was cut short. In five days he was well, and has had no attack since June 21st.

My brother, Dr. R. H. Derby of New York, writes me as follows:

"In June last I had a case of purulent conjunctivitis that had been treated for three days with ice and nitrate of silver, the usual remedies. When I was called in, the conjunctival symptoms had largely abated. There was on the left cornea a central ulcer,

deep and threatening. The patient was a girl of sixteen and was found to have a leucorrheal discharge. The secretions from the eye had been examined twice, and the diagnosis of gonorrhœal ophthalmia had been made. I was told, however, that no gonococcus had been found. It was about that time that you wrote me of the value of holocain in cases of infected corneal ulcer. I made instillations of this drug, together with atropine and occasional warm compresses of camomile. The improvement in the corneal process was very rapid and the eye shows to-day a small central corneal macula, with a vision of ten-tenths."

For the following case I am indebted to Dr. Myles Standish of Boston, in whose practice it ocurred.

" Mrs. E. M. H., married, forty years old, came June 1, 1897, with two infiltrated ulcers of cornea in the right eye, pin-head in size, and at about the margin of its pupil when moderately dilated, also with a gray infiltration just below pupil in the left eye. The ulcerations failed to heal, did not greatly extend in area ; for several weeks new blebs appeared in each cornea which soon became ulcers, and about February 1, 1898, the ulcers increased in size on both corneæ. Patient up to this time had been treated with some antiseptic ointments, having for their active principle either the yellow oxide or the red iodide of mercury. Had also had atropine and at times pilocarpine and hot fomentations.

About February 5th patient was put on a solution of holocain and all other treatment omitted. There was immediate improvement, and new herpetic blebs ceased to appear. Eyes steadily improved. April 4th holocain was omitted, and on April 12th the patient returned with a new ulcer on the cornea of right, which did well when holocain was resumed. This experience was repeated on two subsequent occasions, and holocain was only finally omitted on June 15, 1898.

While so brief a series of cases conveys no certain proof of the value of holocain as a therapeutical agent, it distinctly encourages additional investigations in this direction.

That holocain has its limitations, even as an analgesic, is shown by my recent experience in a protracted and most painful case of double scleritis. While cocaine had absolutely no effect, holocain caused a disagreeable, burning sensation, lasting some hours after each application, and obliging its discontinuance. Relief was only obtained by leeching the temples and the use of fomentations.

A CASE OF EXTENSIVE CHRONIC EMPYEMA OF THE FRONTAL AND ETHMOIDAL SINUSES WITH EXOPHTHALMOS; OPERATION; RECOVERY.

By ARNOLD H. KNAPP, M.D.

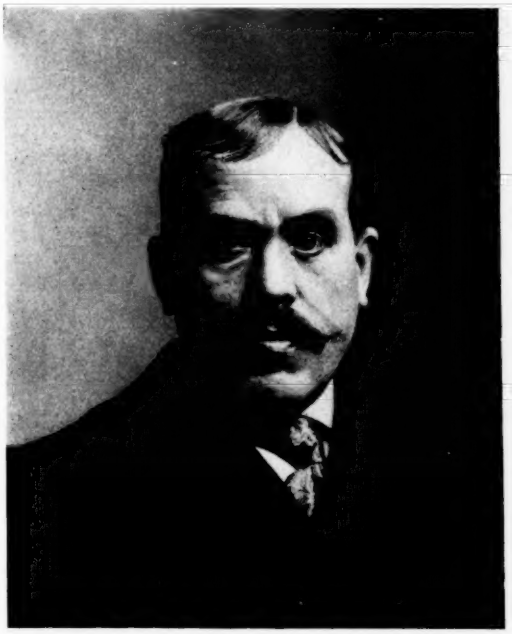
(*With a figure on Text-Plate I.*)

S. R., thirty-five years of age, came to the Dispensary of the New York Ophthalmic and Aural Institute on February 25, 1898, complaining of protrusion of his left eye and a discharge from the nose, of one year's duration.

On examination, an exophthalmos was very noticeable; the eye not only protruded, but was displaced down and out. The upper lid was thickened and drooped, covering a soft swelling in the upper part of the orbit. Pressure on this swelling caused thick pus to appear in the left nasal passage. The mobility of the eye was restricted, the vision normal. Ophthalmoscopic examination revealed venous congestion of the retina. On examining the nose, the left middle turbinate was found hypertrophied and pressed against the septum. The middle meatus contained polypoid masses and thick offensive pus. The probe detected extensive necrosis of the ethmoidal cells. Exploratory puncture of the left maxillary antrum proved negative. The patient otherwise appeared to be in excellent health; there was no evidence of an intracranial complication, nor of any constitutional disease.

A futile attempt was made to improve the nasal condition by removing the hypertrophic masses in the middle meatus and curetting the ethmoidal cells, but the disease was found to be too extensive, and the external operation was immediately decided upon.

On March 5th, under ether-anæsthesia, the left nasal passage was plugged posteriorly to prevent the entrance of pus or blood



Case of chronic empyema of the frontal and ethmoidal sinuses with exophthalmos.
Photograph taken eight months after operation.

into the pharynx during the operation. The incision commencing at the external angular process was carried along the supraorbital arch to the root of the nose, and then vertically down to the internal palpebral ligament. In completing the incision down to the periosteum at the orbital margin an abscess cavity was opened, and a large quantity of very offensive pus evacuated. The finger, introduced into this opening, entered a large cavity extending deep into the orbit, limited anteriorly by a sharp rough edge of bone. The periosteum was readily elevated from the inner bony wall and what was left of the upper wall of the orbit. The soft orbital contents were then retracted, exposing the entire inner and upper walls nearly to the apex of the orbit. The frontal sinus extended across the roof of the orbit; its lower wall was extensively necrosed showing a round defect of 2.5 *cm* in diameter. After removing the remainder of this lower wall up to the supraorbital margin which was left intact, the upper wall of the sinus could be thoroughly explored, and presented no evidence of necrosis. The structures at the inner wall of the orbit were extensively diseased; the ethmoid labyrinth consisted of a meshwork of necrotic bone and granulations. These were carefully removed with the sharp spoon and the bone forceps, so that the defect comprehended the lower part of frontal sinus, the adjoining part of the lacrymal bone and the entire os planum of ethmoid, exposing a small area of healthy dura above, at the floor of the anterior cranial fossa. A wide opening was thus made into the nose, laying bare the entire middle meatus. As the sphenoidal cells are often affected in ethmoid disease, the anterior wall of the sphenoidal sinus was opened, but the sinus proved healthy. Finally, attention was directed to the remaining part of the frontal sinus, *i. e.*, the anterior and upper walls and the septum. The septum contained a smooth-walled perforation, freely communicating with the frontal sinus of the opposite side. The latter sinus, however, as far as could be ascertained with the probe, was not particularly affected. The posterior surface of the anterior wall of the left frontal sinus, which was quite long, and the adjoining portion of the roof, were very carefully curetted under guidance of the touch. This was the only part of the field of operation which was not accessible to direct inspection, as it is desirable for cosmetic reasons not to encroach upon the anterior wall representing the supraorbital arch and the superciliary ridge. The entire wound was packed with iodoform gauze.

The patient's recovery from the operation was speedy and uneventful. Some inconvenience was caused during the first days by swelling of the lids and conjunctiva. The nose was irrigated at regular intervals. No especial discharge, and no fever. The packing was changed on the third day, and thereafter on alternate days. The amount of packing was gradually diminished as the soft parts of the orbit rose to fill up the cavity. The exophthalmos steadily decreased. The eye was unaffected. The wound healing progressed favorably until March 22d, four days after the patient's discharge from the hospital, when an attack of facial erysipelas set in, which lasted about nine days. The wound had closed with the exception of two openings, one at the outer angle of the orbit, short and leading back, the other, and larger one, at the inner angle, leading up and back and discharging some pus. The latter was purposely kept wide open, though no bare bone could be detected. Two granulating masses were removed from the middle meatus of the nose. The outer wound closed promptly. The one at the inner angle of the orbit progressed favorably, the discharge gradually ceased, and the wound was permanently healed on July 2, 1898, almost four months after the operation.

The exophthalmos has disappeared entirely; the eye, however, is somewhat lower than its partner. Sight, fundus, and mobility, normal. No diplopia, and no ptosis. Below the supraorbital margin, at its inner angle, there is a slightly depressed scar, causing no deformity. (See illustration, taken on Dec. 29, 1898.)

REMARKS.—This method of operating is the one advocated by Jansen. He has described eight cases operated on in this manner.[1] The line of incision permits of the elevation of the periosteum lining the upper and inner walls of the orbit, allowing the exposure of the frontal, ethmoidal, and sphenoidal sinuses. The hemorrhage after the cutaneous incision is free but readily controlled. The trochlea is detached together with the periosteum without causing any, or only, transient interference with its function. Unless the anterior wall of the frontal sinus is necrosed, no part of it need be removed which is essential to prevent any subsequent disfigurement. The frontal sinus can usually be satisfactorily dealt with from its lower and orbital surface; this is also most advantageous as regards drainage. The ethmoid labyrinth

[1] *Arch. f. Laryngologie*, 1894, vol. i., p. 114 and following.

can be thoroughly explored, as it can only be done by way of the orbit, and properly drained by way of the nose. The sphenoidal cavity can be directly inspected. It seems to me that the establishment of perfect drainage is the important step in the entire operation. This is secured by the broad opening into the middle meatus of the nose, requiring, as in our case, the removal of the entire os planum of the ethmoid. Kuhnt[1] removes the anterior wall of the frontal sinus in the usual cases of frontal empyema, and also employs a similar, though less extensive incision along the concavity of the orbital margin at its upper and inner angle, if the sinus is small in size, as shown by transillumination, and if the lower wall of the frontal sinus or the ethmoidal cells are involved. In two cases, Nos. xiii. and xiv., which were operated on according to the latter, or the author's second, method, the anterior and lower walls of the sinus were removed, and the ethmoidal cells curetted. The wound was drained from in front. He considers a broad communication between the wound and the nose to be very undesirable because of the danger of infection from the nose. This danger of infection is, I think, exaggerated, the wound granulates rapidly, and the nasal passage can be kept comparatively clean by frequent irrigation. The deeper parts of so extensive a wound cannot be satisfactorily drained by an opening in the face. Grünwald[2] has suggested a similar incision and method of procedure from studies on the cadaver. He was not satisfied with the cosmetic results of the Jansen operation and prefers the method of resecting the anterior wall of the sinus.

Many methods, associated with the names of Panas, Ogston-Luc, Czerny, Killian, Golovine, and others, have been proposed, and are being practised, for the treatment of frontal empyema. Uncomplicated cases can be cured by various ways of operating, as a study of the literature shows. It, however, must always be borne in mind that the lower wall of the frontal sinus is the one most apt to be affected, that perforation generally occurs through this wall, and that the adjoining cells of the ethmoid are frequently involved.

[1] *Entzündliche Erkrankungen der Stirnhöhlen*, 1895, p. 208 and following.
[2] *Die Naseneiterungen*, 2d edition, 1896, p. 220.

Jansen even believes that they are always involved in empyema of the frontal sinus, and that they may even be the primary focus. Hence the method which renders these regions most accessible to inspection and operative interference, and provides for the best subsequent drainage should be the one adopted.

THE PATHOLOGICAL ANATOMY OF POLYPOID TUMORS OF THE CONJUNCTIVA.

By Dr. ISCHREYT.

From the Laboratory of the Ophthalmological Clinic of Professor Raehlmann, Dorpat.

Translated by Dr. Coleman W. Cutler, New York.

(*With a lithographic plate Taf. III. of Vol. XXXII. of Germ. edition.*)

Elschnig[1] revised the classification of the benign polypoid tumors of the conjunctiva, and adapted it to the standpoint of modern pathological anatomy. Since that time additions[2] have been made to our knowledge of the subject, most of the cases reported being conjunctival papillomata, a number soft fibromata and adenomata, while hard fibromata do not appear to have been observed since the publication of Elschnig's article. Ischreyt reports the following case, because it occupies a position apart from that of the above-mentioned forms.

The patient, a man of fifty-nine years, had, in the right lower fornix, near the outer angle, a pedunculated tumor, 8 *mm* long and 4–5 *mm* broad, which sprang from the conjunctiva of the orbit. The color was dark red, the surface divided into slightly prominent, irregular lobes. The consistency was thought to be firm, no note of this having been made. The tumor was supposed to have started twenty years previously, as a result of a wound caused by a fragment of iron, and to have grown extremely slowly. The patient stated that a spontaneous separation,

[1] *Arch. f. Augenheilk.*, xix., 1889, p. 63.
[2] *L. c.*, and Zimmermann, *Klin. Mon. f. Augenheilk.*, xxxii., p. 371.

followed by a recurrence, had not occurred, nor had there been hemorrhages. It is said that there had been marked pulsation after physical exertion, but no discomfort had been felt. There were cicatrices of an old trachoma in the conjunctiva of the tarsus.

In general, three zones were distinguishable in the tumor from centre to periphery. In the central portion, a formation of new connective tissue; in the periphery, lymphoid tissue covered with epithelium, and between these a gradual transition from one to the other. The connective tissue was firm, poor in cells, and contained many elastic fibres. There were numerous large vessels and blood spaces in the central portion, and but few nuclei, the tissue having the appearance of undergoing hyaline degeneration. Toward the periphery, spindle-shaped cells appeared, followed by round cells until the tissue became adenoid in character. The epithelium was thrown into numerous folds, some having the appearance of glands. The cylinder cells had hyaline borders at their free ends and were unusually long, especially in the furrows, where they were arranged in two layers.

In certain conjunctival folds there were finely granular masses, cells, and lumps of varying form and size, situated mostly near one another, and appearing to be transitions of one into the other. Next to cells of normal appearance with large nuclei, were those with finely granular cell body, further little masses of the same size and of a hyaline appearance, and larger masses, evidently the result of coalescence of smaller ones, and finally large, globular, hyaline, and often ruptured bodies, with concentric layers. Goblet cells were nowhere to be seen.

The fibrous basis of the tumor is of the nature of a hard fibroma, in which, according to Billroth, Eppinger,[1] and Rindfleisch,[2] a cavernous metamorphosis is not unusual. The folds of the mucous membrane suggest the so-called Henle's glands, and would, according to the author, be extremely suggestive if they occurred in the normal conjunc-

[1] *Handbuch der Patholog. Anat. v. Klebs*, ii., 1, p. 71.
[2] *Lehrbuch d. pathol. Gewebelehre*, Leipzig, 1878, p. 116 *ff.*

tiva. There was no formation of cysts, probably because the folds of conjunctiva were too superficial. The regressive metamorphosis is not to be wondered at if the long existence of the tumor is considered.

The author emphasizes especially the appearance of a double transformation, that of connective tissue into hyalin, and of epithelium into mucus.

In the attempt to give this tumor a name, the author would place it in the list of polypi, as understood by Eppinger (*l. c.*), "a circumscribed hyperplasia of the mucous membrane and of the submucous connective tissue," did he not prefer to drop the term polypus entirely as applied to a definite form of tumor. A substitute for this is difficult to find, as the complicated histological structure prevents the choice of a short name. The case then is one of a telangiectatic mixed tumor with new formation of firm connective tissue and of epithelium, which is the scene of a secondary hyaline and mucous degeneration. According to Virchow[1] and Eppinger,[2] a simple inflammatory hyperplasia may be the first stage in the development of a polyp; the traumatism, then, followed by the mechanical effect of the movements of lids and eyeball, may well have been sufficient to transform the original swelling of the conjunctiva into a pedunculated polypus.

Explanation of the Figures on Plate III.

FIG. 1.—From the peripheral portion of the tumor. *a*, section of a conjunctival fold. *b*, vessels (the blood contained in the vessels is not drawn). *c*, zone of transition. *A*, zone of lymphatic tissue.

FIG. 2.—From the central portion of the tumor. *b*, blood-vessel. *c*, connective tissue, with elastic fibres. *l*, blood spaces.

FIG. 3.—Gland-like infolding of the conjunctiva. *I*, apparent mouth. *III*, junction of two tubes.

FIG. 4.—Products of hyaline degeneration, from the conjunctival folds.

[1] *Die Krankhaften Geschwülste*, 1863, i., p. 65.
[2] *L. c.*, p. 226.

ABSTRACTS OF ARTICLES, NOT PREVIOUSLY TRANSLATED, IN VOL. XXXII. (1896) OF THE ARCHIV FÜR AUGENHEILKUNDE.

By Dr. COLEMAN W. CUTLER, New York.

IV.[1]—The Etiology and Treatment of Certain Forms of Conjunctivitis Pseudo-Membranosa.

By Dr. **ORLANDO PES**

(Assistant in the Ophthalmological Clinic of the University of Turin).

THE author reviews the work that has been done in defining and classifying the different varieties of membranous conjunctivitis, reports four cases which he has observed, and discusses the nature of the Klebs-Loeffler bacillus and other similar organisms in their relation to the causation of the disease and to its treatment.

As early as 1879, Nettleship expressed the belief that while there might be differences in the clinical appearances depending on the severity of the case, the process was always the same. Sourdille concluded that all forms of membranous conjunctivitis are caused by the Loeffler bacillus, and that the intensity of the inflammation depends on the association of other microbes and on the varying virulence of the diphtheria bacillus. Valude and Van den Bergh have attempted classifications from a clinical standpoint with more or less success. The author alludes to the confusion that exists in the treatment, and agrees with Gaupillat, who states that the varying success in the treatment may be explained by the differences in the nature of the cases.

[1] The numbers correspond to the numbers of the German edition.

Coppez is said to have been the first to use antitoxin in a case of membranous conjunctivitis, a procedure imitated by many others with equal success. In all the cases referred to by the author excepting those of Darier and Sourdille where only streptococci were found, the Klebs-Loeffler bacillus was demonstrated, sometimes alone or associated with staphylococcus, streptococcus, or the diplococcus of Fraenkel. Among eleven cases there was no sign of diphtheria in other organs in four, in three there was diphtheria of the nasal mucous membrane, and in two of the larynx. Of the four cases reported by the author, the Klebs-Loeffler bacillus was present in three, while in one only the staphylococcus pyogenes albus was found after a thorough examination with inoculation and cultures. In this case the membrane disappeared a day after a moderate dose of the antitoxin, which leads the author to inquire whether the diphtheria bacillus may not have been present at an earlier period, or whether, if the staphylococcus is assumed to be the cause of the pseudo-membranous inflammation, the antitoxin was of use. The latter view seems to him more acceptable for the reason that the inflammation assumed a benign character so soon after the use of the remedy. In the three cases where the bacillus of diphtheria was present, it had an especially virulent character; one in particular being noteworthy, where the ocular symptoms were comparatively mild while the inoculation of a guinea-pig showed an exceptionally active bacillus, but of a smaller form, claimed by Martin to be benign.

The simple microscopic examination of the membrane is of no value, for the diagnosis of diphtheritic conjunctivitis and a bacteriological examination requires three days, but the author believes that the inoculation of serum should be made at once. The remainder of the article deals with the morphology of the Klebs-Loeffler bacillus and its possible relation to the xerosis bacillus which the author would call bacillus of the secretion of the Meibomian glands, and to the bacillus pseudo-diphthericus. The confusion that exists in the minds of bacteriologists regarding these questions is indicated by the numerous quotations. The author is unable

to reach any conclusion, but seems to favor the assumption of Sourdille, that for all forms of croupous conjunctivitis, a diphtheritic origin may be admitted, but he is not prepared to deny that pyogenic organisms alone may cause a pseudo-membranous conjunctivitis.

In addition to the inoculation with antitoxin, local treatment, consisting of antiseptic irrigations, should be continued as a matter of routine. The article is accompanied by a bibliography of sixty-five references.

VIII.—Experiments on the Action of Subconjunctival Injections of Salt Solution, upon Absorption from the Anterior Chamber and Vitreous.

By Dr. **CARL MELLINGER**, Basel.

In this article, Mellinger continues the line of investigation with which he has been occupied for some time past,[1] and produces results of considerable interest. The action of salt solution on the lymph, to which, in common with sugar, urea, and some other substances, the name lymphagogue has been given by Heidenhain, is shown by Mellinger to be available for therapeutic purposes.

An emulsion of india ink was injected into the anterior chambers of a rabbit. A salt solution of 0.75 %, 2 %, 4 %, or 10 % strength was injected beneath the conjunctiva of one eye. After six injections, preferably of the stronger solutions, the india ink had been almost entirely absorbed, while in the eye left to itself there was practically no change.

In the case of ink injected into the vitreous, the results are equally satisfactory; the stronger solutions, 4 % and 10 %, being used and a visible difference between the two eyes appearing after five to eight injections. After twenty-one injections, the eye in which the salt solution was used had become almost free from ink, while the other remained in nearly its original condition, and, by degrees, began to atrophy. After a large number of injections (forty-five in one eye), there resulted only a slight thickening of the con-

[1] Arch. of Ophthal., July, 1897, p. 416

junctiva and no cicatrization. Where too much ink had been injected, the eye became irritable, with pericorneal injection, and the ink in the vitreous was enveloped in white exudation; in such cases, it was striking how much more quickly the signs of inflammation vanished in the eye treated with injections of salt solution.

The explanation of this result is as follows: Certain crystalline substances, among which chloride of sodium stands first, withdraw water from the tissues in proportion to their molecular composition, and to the strength of the solution. If the solution is introduced beneath the conjunctiva, it enters the lymph spaces into which the channels from the interior of the eye empty, and tends to extract an excess of fluid from that organ, thereby making place for fresh nutritive material. The action of the solution is stronger in diseased than in normal tissues, according to Mellinger, and explains the success which he has observed following its use in cases of vitreous opacities. The best results have been obtained in recent cases, and especially in traumatic hemorrhage into the vitreous. Old opacities following irido-choroiditis and myopia have been less favorably affected. The conclusions are summarized in the following manner:

1. In the anterior chamber india ink is absorbed three to five times as quickly under the influence of subconjunctival injections of salt solutions as when left to itself.

2. Of the vitreous the same is true, but three or four times as many injections are needed as in the anterior chamber, and stronger solutions, at least 4%, are required.

IX.—The Cortical Pupillary Reflex of Haab in its Relation to the Hemiopic Pupillary Reaction.

By Dr. **HEDDAEUS**, Essen a. d. Ruhr.

The phenomenon called by Haab cortical pupillary reflex is thus described by him. The patient sits in a dark room facing me. At his side and in front, at an angle to the visual axis of about 45°, stands a lamp burning not too brightly. He is directed to gaze before him into the dark-

ness or at my pupil or head, during which time his pupils dilate. Suddenly he is asked, "Do you see the lamp?" his attention being drawn to it without turning the eyes, and at this moment the pupils become narrow and the usual oscillation is seen. Haab claimed that this was a newly discovered reflex act, depending on the direction of the attention upon the object, and a thereby increased stimulation of the retina, transmitted to the cortex, and thence to the pupillary fibres of the oculo-motor nerve. Heddaeus asserts that the process is merely a result of an involuntary accommodation which had become relaxed during the pause, and is suddenly stimulated to action by the call upon the attention. This is indirectly a cortical process and not a reflex, for the impulse to the innervation of the three actions, convergence, accommodation, and the accompanying contraction of the iris, arises undoubtedly in the visual centre of the cortex.

When a patient with hemianopsia is examined for the hemiopic pupillary reaction by moving a light from one side to the other, we wish to ascertain whether the blind halves of the retina have lost their reflex sensitiveness with their subjective sensitiveness. We cannot prevent the patient from responding with "Haab's attention-reflex" in such cases, so that the value of the hemianopic reaction as a diagnostic sign is diminished.

X.—Partial, Isolated Paresis of the Orbicularis Palpebrarum.

By Dr. **P. SILEX**, Berlin.

The histories of three cases are reported which are believed to be unique. The patients were healthy women, who suddenly, without other disorder, became affected in the following manner: The upper lid of one eye—the right in two cases, the left in one—is drawn upwards forming a deep furrow at the upper edge of the tarsus with a fulness above that. In looking upwards, forwards, or downwards there is exposed a strip of sclera $1\frac{1}{2}$ to 2 *mm* broad. The eye can be closed on rolling the eyeball upward but only by forced action of the frontalis, and even then the closure is

not complete. The lower lid appears to have its normal position and motility.

In one case, the condition disappeared in a year and a half, without treatment, and has not returned although six years have passed. The others are still under observation, and the author thinks from the analogy that the prospect for their recovery is good. The diagnosis is ingeniously established by the exclusion of Basedow's disease, spasm of Müller's muscle, and spasm of the levator palpebræ. The upper lid may also be abnormally elevated in a healthy eye when the other lid is depressed by trachoma or paralysis of the levator; also in paralysis of the rectus superior there may be overaction of the levator, but none of these conditions existed here.

Mendel,[1] Turner,[2] and Tooth have made it probable that the upper and lower branches of the facial nerve have different nuclei. In inferior bulbar paralysis, when the upper portion of the facial nerve was active, they found total degeneration of that group of cells in the floor of the fourth ventricle, previously thought to be the nucleus of the nerve. Experiments and clinical observation tend to show that the nucleus of the upper branch lies in the posterior part of the oculo-motor nucleus.

We are inclined to think of a paralysis of nuclear origin when only one branch of a nerve escapes or when only one is involved, but it must be remembered that an isolated paralysis of the sphincter or of accommodation is by no means always due to a nuclear lesion, but may be the remains of a peripheral, basal, oculo-motor paralysis, perhaps of syphilitic origin, in which case the prognosis for the nervous system would not be unfavorable.

In the cases under consideration, because of the recovery of one and their sudden and uncomplicated occurrence, the author is inclined to consider the lesion peripheral and of unknown nature.

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[1] *Neurolog. Centralbl.*, 1881, No. 23.
[2] *Neurolog. Centralbl.*, 1892, S. 475.

XI.—A Consideration of Dr. Ahlström's Article on the Antiseptic Action of the Tears.

By Dr. **LUDWIG BACH**, Würzburg.

One of the most important steps in recent scientific progress is the discovery that the organism produces substances which protect it against bacterial action. This process may be called auto-disinfection of the organism, and is brought about principally by the secretions of mucous membranes and glands. Ziegler has shown that mucus will kill pus cocci and cholera spirillæ, if they are not present in too large a quantity, in twenty-four hours. And recently A. Edinger has proven that human sputum possesses important disinfecting properties, which, he asserts, depend on the presence of rhodankalium. Bach and Bernheim have attributed to the secretions of the lacrymal gland and the mucous glands of the conjunctiva the same properties.

Ahlström [1] took exception to Bach's statement, and produced evidence to show that the tears are not always active in disinfection. He attributed their variable action to the varying alkalinity, claiming that the antiseptic action is inversely as the alkalinity.

Bach, in the present article, re-establishes his position, and proves that the alkalinity has nothing to do with the case.

XVI.—Tuberculosis of the Cornea.

By. Dr. **LUDWIG BACH**, Würzburg.

Tubercular disease of the cornea occurs oftenest as a result of primary tuberculosis of the uveal tract and may present itself in various ways. At times, the typical appearance of parenchymatous keratitis is seen, always following the development of tubercular nodules in the ligamentum pectinatum. When there are few nodules, the keratitis probably occurs through the diffusion of toxines in the corneal tissue. In such cases the opacity of the cornea may entirely disappear. Where the primary nodules are numerous and encroach upon the cornea, the picture of parenchymatous

[1] *Centralblatt f. prakt. Augenheilkunde*, July, 1895, S. 1.

keratitis may also be produced but such nodules in the cornea are not capable of complete regression but leave opacities where the nodules had been. The clinical picture of sclerotizing keratitis may be produced if the nodules in the ligamentum pectinatum occur successively, at intervals sufficiently long to avoid the general keratitis. Very gradually, the nodule pushes forward, generally in the inner layers of the cornea, and gradually it recedes, leaving a permanent, grayish, tongue-shaped opacity. In the usual form of parenchymatous keratitis there is generally a severe iritis, but in the sclerotizing, tubercular keratitis the iris is less often affected. In recent years, the occurrence of tubercular nodules, primarily in the corneo-scleral margin, and even in the periphery of the cornea, has been observed in the Würzburg clinic. These nodules advance gradually into the cornea and heal with obliteration of the limbus at the point of eruption or leaving a tongue-shaped opacity.

Experimentally, the author has produced on the eyes of rabbits by the inoculation of tubercle bacilli exactly the same clinical appearances that had been observed in the cornea of patients. The remaining opacities and the tendency to regression were the same. If the inoculation was made near the centre of the cornea, there was a greater tendency to a superficial loss of tissue. There was little tendency to cheesy degeneration in the nodules examined. In the fresher ones, the bacilli were found, but where the nodule had regressed they were not present. There was a noticeable swelling in the neighborhood of the nodules, so that the cornea was in places double its usual thickness. There was no necrosis of the tissue around the tubercles, such as is present after inoculation with staphylococci. A moderate involvement of the iris was observed in a few cases, either of an inflammatory nature or with the development of nodules. When only one or two nodules were present in the corneal margin, the iris remained almost invariably free.

The cornea may also be involved by continuity or contiguity from a primarily diseased conjunctiva.

XVIII.—The Relations between Disturbances of Orientation and Unilateral and Bilateral Hemianopsia.

By Dr. **A. PETERS**, Bonn.

In cases of double hemianopsia with preservation of a small central area, peculiar disturbances of orientation have been observed, consisting of weakening of the memory for places, and in loss of power to group seen objects correctly in space and to estimate their relation to each other. As yet, attempts to account for these phenomena have not been successful. The following case, with the autopsy, although the latter is lacking in detail, may, the author believes, throw some light on the subject.

The patient, a foundry-workman of sixty-eight years, with good habits and no indications of syphilis, suddenly and without previous vertigo, nausea, or headache, noticed that vision had failed, and that he was unable to make certain measurements.

On his twenty-minute walk homeward he staggered and was unable to find his way. The eyes were absolutely normal, except for a slight difference in the size of the pupils; the pupils, however, reacted normally. Vision was $\frac{8}{10}$, and with correction of the presbyopia he could spell words in Jaeger 8, but was unable to read the simplest word, *e. g.*, the word "das" was spelled correctly, but when asked what it was, he replied, "als." He said he could see the letters, but could not bring them together.

Later, after prolonged study, he deciphered short words after many failures, but was never able to read long words. His name was written hesitatingly, but correctly. Asked to write "der," the patient said he could not bring the letters together, and then wrote "das." Separate letters were always correctly written. Memory for objects, familiar and otherwise, was variable, while for events past and present it was unimpaired; in fact, the intelligence seems not to have suffered.

The helplessness of the patient, with vision of $\frac{8}{10}$, is striking. There is typical left hemianopsia for white and colors. The line of demarkation is vertical, with a projection of only a few degrees of good vision, around the point of fixation. The retained field is slightly narrowed concentrically. The defect of the field, how-

ever, with the diminished acuity of vision, is not enough to explain the helplessness or clumsiness of the patient. He feels his way about with outstretched hands, like a blind man. If he is asked to touch his own finger, he does it slowly and hesitatingly, whereas a blind man is able to do so promptly. The patient states that he sees the finger but does not know the place where it is. He does not attempt to supply the loss of the field by movements of the head, since the remaining portion is still quite large and contains the fixation point. The feeling or exploration of objects with the eyes, as is the rule when the field is very small, is absent; the object is quickly fixed, yet the above-mentioned symptoms are present. There are no other symptoms referable to the brain. In other organs there are signs of atheroma, tortuous and rigid radial and temporal arteries, and a soft, systolic murmur over the apex. In the urine there is neither albumen nor sugar. In the next few weeks, the disturbance of orientation increased considerably; the patient found his bed with difficulty, he saw the door clearly but reached it to open it very slowly. Six months after the first examination the retained halves of the field had become morbidly narrow, so that in the left eye, the extent to the left was 3°, to the right $2\frac{1}{2}$°, upwards 3°, downwards 4°; in the right eye, left 3°, right 3°, upwards 4°, and downwards 10°. Colors were correctly recognized and named. Vision was at this time slightly diminished, $\frac{20}{100}$.

Stimulated by Förster's paper,[1] I had the patient draw small figures; a circle was correctly drawn, but a square was impossible; he begins with two crossed lines and can go no farther. Simple sums are correctly solved. Topographical conceptions of things that were formerly familiar were not intact. The patient is unable to describe the road from his house to mine, he gives the streets and directions, right or left, incorrectly. In short, the disturbances described by Förster are present in the same degree. The hemianopic reaction of the pupil has not been elicited, and as yet the papillæ show no signs of atrophy.

About six months later, vision on both sides was $\frac{20}{60}$.

The field of vision: R. up, 5°; down, 14°; out, 15°; in, 6°.
L. " 15°; " 15°; " 8°; " 14°.

During the following year, at the end of which the patient died, the vision failed a little while the field seemed to increase slightly to the right as compared with previous examinations.

[1] *Arch. f. Ophthalmologie*, Bd. xxxvi., 1.

The autopsy, apart from œdema of the lungs and general arterio-sclerosis, showed areas of softening in the medullary layer of both occipital lobes, while the outer, cortical portions were intact. I would like to emphasize the fact that the region of the posterior cerebral commissure was involved in the left-sided area of softening, while the right-sided, larger area extended into the cortex of the cuneus on one side, and on the other side it reached, in a small strip, under the ependyma of the left lateral ventricle. The posterior half of the thalamus was flaccid and soft.

The case, then, is similar to that of Förster,[1] which has been recently examined anatomically by Sachs,[2] and in regard to the double hemianopsia and the preservation of a small central portion of the field of vision, it has the same condition as those cases following Förster's article, reported by Schweigger,[3] Groenouw,[4] Vorster,[5] Schmidt-Rimpler,[6] and Magnus.[7] The four cases with disorders of orientation, of Förster, Groenouw, Vorster, and Magnus, had in common the appearance of these disorders simultaneously with the occurrence of the second hemianopsia, which led to the association of these events, and to the reference of the lesion to the cortex and neighboring medullary layer, whereby the symptoms, such as loss of color, sense, and disturbances resembling soul-blindness, were easily explained. So most of the authors who have dealt with the subject of disturbances of orientation have forthwith referred them to the occipital lobes. Sachs says "that the superior association, the joining together and arranging of separate optical images which is at the bottom of the power of orientation, takes place within the occipital lobes, while recognition of objects is a function of the cortex in general, and especially of the temporal lobes and their connection with the rest of the brain." The absence of loss of orientation before the occurrence of the second hemianopsia was logically explained by the as-

[1] *L. c.*
[2] *Arbeiten aus der psychiatr. Klinik in Breslau*, Heft 2.
[3] These ARCHIVES, Vol. xx., p. 83.
[4] *Arch. für Psychiatrie*, Bd. xxiii.
[5] *Allg. Zeitschrift für Psychiatrie*, Bd. xlix., S. 227.
[6] *Arch. für Augenheilk.*, Bd. xxvi., S. 181.
[7] *Deutsche med. Wochenschr.*, 1894, Nr. 4.

sumption that one hemisphere acted for the other and prevented further disturbance of function.

In my case, however, the condition was reversed. With the sudden development of the left hemianopsia, appeared the disorder of orientation, which remained unchanged until death, without being influenced by the second hemianopsia, either at its beginning or during its gradual regression. The left hemisphere must then be eliminated as regards its influence in compensation, improvement, or deterioration in the disturbances of orientation.

I was at first inclined to attribute to the right hemisphere a greater influence on the development of the condition than the left, but Groenouw's case showed an opposite state of affairs, the symptoms following a lesion of the left hemisphere. Both hemispheres, then, are equal in their influence, and Sachs had to assume that the absence of disorder of orientation in Förster's case depended on the vicarious action of the right hemisphere. This assumption, however, is not permissible in my case, and therefore, in my opinion, all attempts at explanation fail that would attribute the disturbance to a lesion of the cortex or neighboring medullary layer.

From the sudden appearance and irreparable character of the lesion, we cannot assume that the disease in the medullary layer of the right hemisphere alone was sufficient to abolish a function common to both hemispheres, but we must conclude that it was those parts of the right area of softening extending across the commissure, and as we cannot suppose that there is here a centre occupied solely with orientation, there remains only the assumption that here paths of association were involved which permit orientation. . . . Unfortunately, my brief notes of the autopsy are not sufficient to solve the anatomical questions, but the fact remains that the right area extended to beneath the ependyma of the left ventricle, and this portion of the lesion must be held responsible for the symptoms.

In the remainder of the article the author discusses briefly the cases to which reference has been made, mentions the results of an autopsy by Anton,[1] and a similar case of his

[1] *Neurolog. Centralbl.*, 1895, S. 955.

own, without autopsy, and closes with the postulate that the attempt to refer disturbances of orientation to the cortex or its neighboring medullary layer must be abandoned. We must rather assume that this complicated function is the result of an anatomical arrangement by which the visual impressions received by the occipital lobes are transmitted to other parts of the brain for elaboration, and disturbances arise through an involvement of fibres of association which in one place are situated close by one another.

XXII.—A Comparative Investigation of Certain Therapeutic Measures Associated with Leucocytosis in the Staphylococcus Ulcer of the Cornea.

By Dr. **OTTO VON SICHERER,**

Assistant at the University Eye Clinic, Munich.

This paper deals, first, with the history of subconjunctival injections. Von Rothmund first used a solution of sodium chloride, 4 per cent. to 12 per cent., to hasten the absorption of corneal exudations. Twenty-three years later Secondi initiated the practice of injecting solutions of corrosive sublimate, with the view that in this way an antiseptic action might be obtained in septic corneal processes. In France this method found many advocates, chief among whom Darier was most outspoken in its praise. A variety of antiseptics were tried and several theories suggested to explain their action. Mellinger was the first to deny any antiseptic action to the sublimate solution, for which he substituted salt solution with equally good effect, and Bach, among others, ended, as it seems, the controversy by demonstrating that the quantity of mercury reaching the affected area was too small to be of any therapeutic service.

The author shows, in an elaborate series of experiments, the influence of various substances on the action of the leucocytes, and quotes from the interesting work done in Buchner's laboratory to explain the properties of the latter.

An ulcer is best produced in the centre of a rabbit's cornea by the injection of one or two drops of a pure staphylococcus culture by means of a syringe and a very fine needle.

In this way a series of lesions is produced of similar intensity, thus adapted for comparative observation. The mode and development of the infection is too well known, since Leber's work on the subject, to require further mention. In the preparation of the cornea for examination the author uses, instead of xylol or zoluol, oil of turpentine, as it causes less shrinking. The following substances were used for subconjunctival injection: Sublimate, 1:1000; sodium chloride, 2:100; oxycyanate of mercury, 1:1000 and 1:500; cinnamate of soda, 5:100; sterilized papayotin solution, 2:100. After the injection there was, in the first twenty-four hours, a noticeable and nearly equal diminution of the necrotic zone surrounding the infiltration for each of these solutions. Microscopically, the necrotic, swollen area of the cornea was more or less permeated with leucocytes, while in the control eye, which had been inoculated with staphylococci but not injected subconjunctivally, this area was free from these cells. The fact that the leucocytes were most numerous in that part of the cornea nearest to point of injection, proves that it was the cause of the increased emigration.

The significance of the emigration of leucocytes has been studied by Leber and recently by Buchner, who believes that the albuminous contents of the bacteria, the so-called "bacteria-proteins," form the attractive agents for the leucocytes; in other words, the alkali-albuminates, the first product of albuminous transformation, also plant-caseins which are closely allied to the bacteria-proteins, possess a chemotactic action. Buchner and his co-workers have made it seem probable that the bactericidal action of the blood and serum is due to the alexines which are the products of the secretion of the leucocytes, and that primarily, at least, there is no such thing as phagocytosis, as Metschnikoff used the word. The author mentions experiments made by Hahn which seem to prove these statements; and to indicate that an increased immigration of leucocytes exerts a favorable influence on infectious processes of the cornea, and that the alexines formed by the leucocytes guard the tissues against the advance of micro-organisms. Since we know, according to Pflüger, that solutions injected beneath the conjunctiva reach

the iris and the anterior chamber as well as the cornea, we may conclude that the chemotactic action is present there also, and that the leucocytes exert a peptic action, according to Leber, softening and dissolving the fibrinous exudate. Among other substances exerting a chemotactic action, is yellow oxide of mercury applied as ointment in the usual manner. Twenty-four hours after the use of this agent, an extensive leucocytosis is apparent as compared with the control eye, the zone of hyaline necrosis has diminished, and fine vessels have begun to advance from the limbus; there is a much more rapid regression of the infiltration and the absorption of the hypopyon. This chemotactic action of the yellow ointment is explained by Buchner to be due to the formation of albuminates which attract the leucocytes. After the use of the ointment, there is often in twenty-four hours a proliferation of epithelial cells on the edge of the infiltration and, as Bach has shown, a diminution of bacteria in the conjunctival sac which tends to prevent reinfection. The conclusions reached are as follows: 1. The favorable effects of subconjunctival injections as well as of yellow ointment on ulcerations of the cornea are due to the leucocytosis produced. 2. Among the solutions for subconjunctival use, 2 % salt solution is to be preferred. 3. Because of its simplicity and efficiency, a protective bandage with yellow ointment, combined when necessary with cauterization, is to be recommended as the best treatment.

The bibliography contains 112 references. Finally there is an elaborate series of tables giving in detail the results of the author's experiments.

XXIII.—A Contribution to the Study of Epidemic Night-Blindness.

By Dr. **SCHTSCHEPOTZEW**, in Kiew, Russia.

This disease is more prevalent in the northern parts of Russia than in the southern, and reaches its greatest intensity in the spring, which shows, according to the author, that bright light has little to do with its causation. The cold of winter can likewise play no part. Well nourished,

robust people are often affected, while not infrequently the weak, anæmic, and scorbutic escape. There have been widespread epidemics in France and Russia, in crowded centres as well as in the country, and as a rule the disease begins and ends at almost the same time of year in widely separated regions, under different conditions of weather. Night-blindness is epidemic especially in low, swampy lands and in the neighborhood of bodies of water. The author concludes from these facts that the disease is of a miasmatic nature. A statement that will bear further investigation is that the night-blind see much worse in the evening, after sunset, than in a darkened room in the daytime; even when there is more light in the former case than in the latter. A frequent though not constant symptom is dilatation and paresis of the pupils. The wide veins and narrow arteries which are said to occur, the sudden onset and disappearance in some cases following a shock, as well as the favorable results of treatment with quinine and antipyrin, lead the author to the conclusion that the anatomical basis of the disease is of a vaso-motor nature.

XXVI.—Historical Remarks on the Anatomy of the Ora Serrata.

By Dr. **E. BERGER**, Paris.

The author calls attention to the fact that Schön, in his article, "The Functional Diseases of the Ora Serrata and the Ciliary Portion of the Retina,"[1] neglects to give him credit for previous investigation in the same field.[2]

XXVII.—A Case of Unilateral Loss of the Pupillary Light-Reflex.

By Dr. **L. CASPAR**, Mülheim-a.-Rh.

A teacher, aged thirty-eight, of healthy family, and without history of previous illness, suffered for several years from nervousness and insomnia, frequent severe headache, and occasional brief attacks of sciatica. Beer and tobacco had been used immoder-

[1] Abstracted in these Archives, July, 1897.
[2] *Beiträge zur Anatomie des Auges*, etc., Wiesbaden, J. F. Bergmann, 1897.

ately. No history of syphilis was obtained. The patellar reflex was absent. V. R $\frac{6}{24}$ with + 2. D, L $\frac{6}{8}$ with + 1.75 D. The eyes seemed normal in all respects save for the pupillary anomaly to be described. The right pupil, with ordinary illumination, is 4 *mm* in diameter, the left 3 *mm;* with completely relaxed accommodation, the right does not change, the left dilates to 5 *mm.* If the eyes are covered, the left pupil remains unchanged, while the right promptly enlarges to 5 *mm* or more. In a strong light, as well as in accommodation and convergence, the right pupil contracts to 3 *mm;* consensually the reaction of the right pupil is less and slower than by direct illumination. The direct and consensual reactions of the left pupil are lost, even with the strongest illumination, but in accommodation and convergence there is a rapid contraction to 2 *mm*, which is more than the right eye shows. Accommodation is normal.

The explanation offered is that of Heddaeus, which assumes a lesion in the centrifugal fibres between the nucleus of the sphincter iridis and the junction with these fibres of the bundle from the nucleus of accommodation. The slow consensual reaction of the right pupil may be explained by the comparative myosis of the left eye, which admits less light, but the author assumes an extension of the process upwards and a partial involvement of the left nucleus, to account for the loss of consensual reaction on the left side and its impairment on the right side. The greater width of the left pupil may be due to the absence of reflex tone, due to interruption of the centrifugal path.

XXVIII.—Adenoma of the Ciliary Body as Cause of Glaucoma.

By Dr. **ED. PERGENS,** Brussels.

In 1891, Jan V., æt. fifty-six, felt that his right eye was inflamed. Shortly before a small piece of iron had struck the eye, but probably had not penetrated. Successive attacks of glaucoma led in 1895 to enucleation.

Fontana's space was found to be obliterated, also where iridectomy had been done. In the ciliary body was found a small tumor 0.75 *mm* long and 0.25 *mm* broad, which, according to the author, must be regarded as cause of the glaucoma.

The tumor was of a tubular nature, the cells resembling the epithelium of the ciliary region. A gelatinous material was present in spaces and canals which branched and anastomosed irregularly. There were no blood- or lymph-vessels, unless the latter were represented by the canals containing the gelatinous material, but no lymph cells were found in these. Connective tissue was not present in the tumor and the muscular portion of the ciliary body was not involved.

A similar tumor, described by Badal and Lagrange,[1] is quoted by the author.

XXIX.—Sarcoma of the Iris.

By Dr. **F. WERTHER**, Warsaw.

The author collects the reports of 23 cases of primary sarcoma of the iris, which he adds to the 16 collected by Fuchs in 1882. Besides these, 2 cases that he has observed are given in detail.

In the first case, occurring in a woman aged seventy-two, the growth was 5 *mm* long and 3 *mm* broad. It involved the peripheral part of the iris, and occupied one-third of the anterior chamber, making an imprint on the lens, and pressing it backward. The sarcoma was composed of spindle cells, pigmented in its anterior portion, but in the part toward the ciliary body almost without pigment. The pigment was mostly in the cells, in places free in the finely fibrillated intercellular substance, and, in the darker half, scattered extensively in clumps. The iris, with the exception of its pupillary zone, was in places taken up by the tumor and separated from its base. The unchanged pigment layer of the iris covered the posterior surface of the tumor. The ciliary muscle, spaces of the ligamentum pectinatum, and Schlemm's plexus of veins were infiltrated with tumor cells.

In the second case, the patient, a woman aged sixty years, had noticed, a few weeks before, a brown fleck in the iris. There was seen to be a brownish-black tumor, the size of a hemp seed. After enucleation, the growth was found to have a length of 4 *mm*. It consisted of spindle cells with and without pigment. As in the first case, the iris was partly taken up by the tumor, leaving the sphincter muscle uninvolved. The median portion of the growth

[1] *Arch. d'opht.*, t. xii., p. 143.

was deeply pigmented, the lateral almost free. Although the posterior surface was covered by the pigment layer of the iris, the sarcoma cells were free in the anterior chamber, in contact with the aqueous humor. In other respects the extension of the tumor was as in the first case.

Conheim states that 14.3 per cent. of the tumors observed in the Berlin clinic followed wounds. Boll found, in 344 cases of carcinoma, 12 per cent. to be traumatic. Fuchs attributes 11 per cent. of the 259 cases of sarcoma collected by him to a traumatic origin, and assumes that a cellular infiltration of the uveal tract, leading to hyperplasia, precedes the development of the sarcoma. Virchow states that it is but a step from inflammatory hyperplasia to sarcoma. It is known that sarcoma of the iris may develop from congenital pigmented flecks, as in the skin, after these have remained stationary for many years.

In the 23 cases collected by the author, the tumor developed 9 times between the ages of forty and sixty, 6 times before the age of thirty, and 5 times after sixty. Men were affected 8 times, women 13 times. In the majority of cases the tumor was of the spindle-celled variety.

The author states that enucleation is preferable to iridectomy in all cases, as it is impossible to tell whether the deeper parts are not already involved, as in his second case. Moreover, in the majority of cases where iridectomy had been done, a recurrence compelled enucleation later.

Statistical tables complete the article, giving the details of cases reported from 1882 to 1893.

SYSTEMATIC REPORT ON THE PROGRESS OF OPHTHALMOLOGY IN THE SECOND QUARTER OF THE YEAR 1898.

By Dr. ST. BERNHEIMER, in Vienna; Dr. O. BRECHT, Prof. R. GREEFF, Prof. C. HORSTMANN, and Prof. P. SILEX, in Berlin;

WITH THE ASSISTANCE OF

Dr. G. Abelsdorf, Berlin; Dr. Swan M. Burnett, Washington; Dr. Dalèn, Stockholm; Dr. Herrnheiser, Prague; Prof. Hirschmann, Charkow; Dr. Krahnstöver, Rome; Dr. P. von Mittelstädt, Metz; Prof. Da Gama Pinto, Lisbon; Dr. Richard Schweigger, Berlin; Dr. Sulzer, Paris; Dr. L. Werner, London; Dr. C. H. A. Westhoff, Amsterdam; and others.

Translated by Dr. Ward A. Holden.

Sections I.–III. Reviewed by Prof. HORSTMANN.

I.—GENERAL OPHTHALMOLOGICAL LITERATURE.

141. Greeff. An introduction to the microscopic examination of the eye. Berlin, 1898, A. Hirschwald.

142. Baas. The visual and pupillary tracts. Charts for ophthalmic instruction. Edited by H. Magnus. Part xiv. Breslau, 1898, Kern.

143. Herrnheiser. The myopic eye. Charts for ophthalmic instruction. Part vi. Breslau, 1898, Kern.

144. Felsch. The ophthalmology of Alcoatim (1159), now first translated into German and annotated. *Inaug. Dissert.*, Berlin, 1898.

145. Hirschberg. Blindness in Spain. *Deutsche med. Wochenschr.*, 1898, No. 23.

146. Widmark. Reports from the eye clinic of the Caroline Medico-chirurgical Institute in Stockholm. Vol. i. Jena, 1898, G. Fischer.

147. Reports from the St. Petersburg Ophthalmic Institute. Vol. v. St. Petersburg, 1896.

148. Bock. Seventh report of the ophthalmic division of the hospital at Laibach, 1897.

Greeff (141) in his small volume gives an excellent introduction to the microscopic examination of the eye. He describes, first, the necessary utensils, the obtaining of material, the study of fresh tissues, and the various hardening methods. He passes then to preparation, imbedding, and staining methods, and to injection, decalcification, and bleaching. In conclusion he treats of the preservation of the eyeball, and microscopic sections. The work is, for those who are concerned with the microscopic study of the eye, of valuable and almost indispensable assistance.

Baas's (142) two charts represent the anatomico-topographical relations of the visual and pupillary tracts, with explanatory text.

Herrnheiser's (143) eight charts, with text, give a comprehensive representation of the myopic eye. The figures are drawn from microscopic sections of eyes with staphyloma posticum, and from the fundus in life.

According to Felsch (144) the writings of Alcoatim, a Spanish Arab, are of great importance in studying the ophthalmology of the middle ages, since writings of this period are few.

Hirschberg (145) reports on the frequency of blindness in Spain. The most frequent causes are blennorrhœa, smallpox, and trachoma. The last disease is found least in the north of Spain, more in the central provinces, and in the eastern and southern regions with great frequency.

The reports from the Stockholm eye clinic (146) comprise the following titles: Widmark, "On the location of the papillo-macular bundle," "Statistical studies on myopia," and "On the limits of the visible spectrum to the violet side"; Dalèn, "Experimental studies on the disinfection of the conjunctival sac"; Hellgren "On the mechanical and therapeutic treatment of trachoma"; Widmark, "The operative treatment of unripe and partially stationary cataracts."

The reports from the St. Petersburg eye clinic (147) comprise tables of the out-patients seen in the years 1892–1894, respectively 18,036, 18,384, and 19,229, and of the in-patients, respectively 1,075, 1,027, and 1,113, prepared by Schroeder, Hermann, Wegert, and Blessig.

Bock (148), in 1897, treated 914 eye patients and made 206 operations, among them 81 cataract operations, 65 iridectomies, 7 squint operations, and 14 enucleations.

II.—GENERAL PATHOLOGY, DIAGNOSIS, AND THERAPEUTICS.

149. v. Hippel, E., Jr. Pathologico-anatomical changes in the eyes of the new-born. *Graefe's Archiv*, xlv., p. 313.

150. Picat. Experimental researches on the inoculation of micro-organisms into the anterior chamber of the rabbit's eye. *Arch. d'opht.*, xviii., No. 6, p. 341.

151. Schanz. The pseudo- and the true diphtheria bacilli. *Wiener med. Presse*, 1898, Nos. 28 and 29.

152. Axenfeld. In how far is the so-called xerosis bacillus of the conjunctiva identical with the Hoffmann-Loeffler pseudo-diphtheria bacillus of the throat? *Berliner klin. Wochenschr.*, 1898, No. 9.

153. Schanz. On the pathogenic quality of the Loeffler diphtheria bacillus. *Deutsche med. Wochenschr.*, 1898, No. 33.

154. Schanz. The value of the statistics as to the serum therapy of diphtheria. *Therap. Monatabl.*, Sept., 1898.

155. Lester and Gomez. Sleep in relation to diseases of the eye. *N. Y. Eye and Ear Infirmary Reports*, Jan., 1898.

Hippel (149) describes the retinal hemorrhages in the new-born, the breaks in Descemet's membrane, and coloboma of the optic nerve with cysts in the retina.

Picat (150), by the injection of pure cultures of pyogenic and of innocent micro-organisms into the anterior chamber of rabbits, sought to determine the action of the antiseptic aqueous and the matter of phagocytosis. Both these play a more important rôle than has been suspected. The aqueous destroys, for example, the anthrax bacillus. The symptom-complex characteristic of the action of a micro-organism varies according to the virulence of the micro-organism and the resistance of the animal, but not according to the quantity of injected micro-organisms.

Some micro-organisms produce a distinctive panophthalmitis, some a curable irido-cyclitis, some a pseudo-tuberculous iritis, and some no disease at all. In most of his experiments, general infection took place, and thus the second eye became diseased, in some cases, like the first. v. MITTELSTÄDT.

According to SCHANZ (151), the pseudo-diphtheria bacillus is identical with the true diphtheria bacillus, but from some cause it produces a more virulent toxin.

AXENFELD (152) regards the two as different varieties of the same family.

Proceeding upon the fact that during sleep the amount of blood in the brain and eye is diminished, those authors (155) consider sleep a valuable therapeutic agent, particularly in forms of intraocular inflammation. BURNETT.

III.—INSTRUMENTS AND REMEDIES.

156. SNEGIREW. On the influence of holocain on diffusion from the conjunctival sac into the anterior chamber. *Wjest. Ophth.*, xv., 3, p. 260.

157. WICHERKIEWICZ. My experience with protargol. *Die Ophth. Klinik*, 1898, No. 18.

158. WICHERKIEWICZ. Xeroform in ophthalmology. *Wochenschr. f. Ther. u. Hygiene d. Auges*, 1898, No. 32.

159. WICHERKIEWICZ. Further reports on xeroform. *Ibid.*, No. 49.

160. EBERSON. On the use of ichthyol in eye diseases. *Klinisch. therap. Wochenschr.*, 1898, No. 18.

161. WOLFBERG. Ichthyol and ichthalbin in ophthalmology. *Wochenschr. f. Ther. u. Hygiene d. Auges*, No. 18.

162. WINSELMANN. On euphthalmin. *Zehender's klin. Monatabl.*, xxxvi., p. 253.

163. PANAS. On oily collyria. *Arch. d'opht.*, xviii., 6, p. 337.

164. SCRINI. Oily collyria. *Thèse de Paris*, 1898.

165. LUKER. Thiosinamine. A clinical contribution to its study. *Ophth. Record*, May, 1898.

166. MULLEN. The use of suprarenal capsule in minor eye surgery. *Ophth. Record*, June, 1898.

167. KYLE. Aqueous extract of suprarenal capsule in ophthalmic practice. *Ibid.*, April, 1898.

168. HEGG. A simple instrument for the determination of the far point in high degrees of myopia. *Zehender's klin. Monatsbl.*, xxxvi., p. 179.

169. ZEHENDER. A goniometer for the exact measurement of the angle of deviation in squinting eyes. *Zehender's klin. Monatsbl.*, xxxvi., p. 184.

170. DERBY, R. H. A modification of the stereoscope. *N. Y. Eye and Ear Infirmary Reports*, Jan., 1898.

171. STEVENS. Same new methods of examination of the positions of the vertical meridians of the retina. *Ophth. Record*, May, 1898.

172. JACKSON. New tests for simulated monocular blindness. *Philada. Med. Jour.*, Apr. 16, 1898.

173. BREWER, E. P. The torsiometer—an instrument for the study of the retinal meridians. *Ophth. Record*, May, 1898.

174. VALUDE and DUCLOS. Section of the iris angle. *Ann. d'ocul.*, cxix., p. 98 and p. 241.

SNEGIREW'S (156) experiments on rabbits' eyes were according to the colorimetric method of Bellarminoff. He instilled 1 % solution of holocain into the eye, following it with fluorescin, and found that the holocain favored diffusion. Comparative experiments with cocaine 2 and 4 % showed that the action of holocain was twice as great as that of cocaine. The author therefore advises replacing cocaine as an adjuvant to solutions of atropine, eserine, etc., by holocain, particularly in cases of increased tension.

HIRSCHMANN.

According to WICHERKIEWICZ (157), in acute catarrhal or granular inflammations, and in corneal ulcers protargol is less efficacious than other drugs, but in affections of the tear sac and in blennorrhœa it is of value.

WICHERKIEWICZ (158), uses xeroform as a dusting powder, and in a 5-10 % ointment for eczema of the lids and conjunctival inflammations, and as an antiseptic after operations. It is of advantage also in corneal ulcers.

EBERSON (160) used 50 % ichthyol solution in cases of trachoma, and found that the course of the disease was shortened, and a smooth healing brought about. It is useful in conjunctival inflammations, with or without corneal complications.

WOLFFBERG (161) gave ichthalbin in 0.5 gramme doses 3 times daily to 40 patients with glaucoma and iritis, and found that the action of the other therapeutic agents used was intensified.

PANAS (163) has replaced the aqueous solutions of the usual alcaloids, by solutions of their bases in olive oil that has been previously heated. Such solutions keep better and are sterile.

v. MITTELSTÄDT.

SCRINI (164) finds that olive oil, vaselin oil, and arachnis do not irritate the conjunctiva while many other oils do. Oily solutions of the alcaloïds are preferable to aqueous solutions, decomposing less readily, remaining sterile, and in the case of cocaine not drying the surface of the cornea. SULZER.

LUKER (165) gives, in this paper, an experience with thiosinamine—a product of mustard-seed oil,—which has been exciting attention among dermatologists lately. He has used it in two cases of choroiditis exsudativa, he thinks, with much benefit, and also in cases of corneal opacity. Its diuretic action is marked. It should be given in capsule form gradually increased from 1 to 3 grains a day. BURNETT.

MULLEN (166) has used extract of suprarenal capsule in conjunction with cocaine in obtaining anæsthesia and anæmia of the conjunctiva in operation for pterygium and in tenotomies with most gratifying results. He uses Armour's preparation of the capsule, grs. v. ad ℥ j of cold water. A drop is put in 10 minutes after the 5 % cocaine solution has been used. The anæmia is most pronounced; there is no danger, and the healing is happy.

BURNETT.

KYLE (167) has had an experience of more than a year in the local use of the aqueous extract of suprarenal capsule in eye diseases, and is most highly pleased with the results. He finds it of great value as an astringent, and anæsthetizer in connection with cocaine. He uses it in a 2 % to 4 % solution of the extract. It contracts the walls of the blood-vessels, in the normal and inflamed conjunctiva, and he has used it with advantage in acute and chronic conjunctivitis, trachoma, panophthalmitis, iritis, lachrymal inflammation, and keratitis. He has never found any ill effects whatever, from its use, even for a considerable time.

BURNETT.

The modification of the stereoscope which DERBY (170) offers consists in a white card on which horizontal and vertical lines are drawn making spaces 1 *cm* square. These are numbered from

the centre, right and left, from 1 to 9. Vertically letters are used to indicate the squares. In front of this the half objects are moved by suitable screws laterally and vertically as may be required for their fusion, and arrangements are also made for the inclination of the test objects for examining the oblique muscles.

BURNETT.

The detection of abnormal leaning of the vertical meridians of the retina which give rise to strain in the effort to bring them into a proper condition of parallelism is the object of these apparatus devised by STEVENS (171). One is a simple apparatus consisting of a series of Maddox rods or of properly ground prisms fitted into an ordinary trial frame. These give, when placed before the eyes, a series of horizontal lines formed of a distant point of light in case there is no abnormal tension. If there is abnormal tension the lines in one eye—or may be both—will be inclined and not parallel with those of the other eye. The amount of rotation of one set of rods necessary to bring about this parallelism is measured on a scale attached to the frame and marks the degree of abnormality. A better instrument still is a modification of the stereoscope involving the same principle which he describes in full. For the correction of these faulty inclinations he now operates on the internal and external recti, by partial section in a manner he describes in detail, but too elaborate for an abstract.

BURNETT.

The two new tests JACKSON (172) employs for the detection of simulated blindness of one eye are these: 1st. The refraction of the "bad" eye is discovered by skiascopy, and the proper glass for that eye is placed before it. Before the other "good" eye compound cylinders are placed in such a way as to give the best vision that eye has. The patient now alleges that he sees only with the "good" eye, and while he engages his attention the axis of one cylinder is, unknown to the patient, turned from its initial position, thus giving a higher degree of compound astigmatism of an entirely different kind to that which the "good" eye may have possessed. To be successful strong cylinders should be used, 4 D at least. If there is no ametropia the $-$ 4 D and $+$ 4 D can be first placed with their axes together, each neutralizing the other—a turn of one axis through 30° will produce a high mixed astigmatism, rendering vision very obscure. If the patient still sees the test letters, it is, of course, with the other "bad" eye. The other test is to have the accommodation abolished and a lens placed in

front of one eye having a focus at 20 inches, the other at 10 inches. If with both eyes open there is vision at each of these distances, respectively, there is of course vision in each eye. BURNETT.

In this paper BREWER (173) first describes an instrument of his devising for determining the amount of abnormal torsion of the eyeballs in any given case, and also the power of torsion possessed by the eyes. The apparatus consists of a series of small Maddox prisms arranged in a cell which can be turned in any desired inclination to the meridian. A pointer and scale give the amount of this turning in degrees. There is one for each eye, and through these the patient looks at a distant point of light, which is by these rods converted into lines of light. The eyes can be dissociated by means of a prism of 9Δ base in. If the lines as seen by the two eyes are parallel, there is no torsion. If they are not, torsion is present and the degree can be determined by the apparatus. A further paper is promised giving greater details of its application to the study of the various forms of heterophoria, and it promises to be a valuable instrument of diagnosis. See also the abstract of Dr. Stevens's paper on the same subject in the same number of the *Opht. Record.* BURNETT.

VALUDE (174) has modified the curvature of de Vincentiis's needle so that the small crescent stands at an angle of 135° with the straight part of the instrument. Experiments were made on the eyes of children soon after death, internal sclerotomy being done with de Vincentiis's needle, Valude's needle, and de Wecker's linear knife, and the eyes afterwards hardened and examined microscopically. Usually Schlemm's canal is opened, and the filtration angle is freed. SULZER.

Sections IV.–VII. Reviewed by DR. ST. BERNHEIMER.

IV.—ANATOMY.

175. ROLLET and JAQUEAU. Topographical anatomy of the macula. *Ann. d'ocul.*, xix., p. 431.

176. GREEFF. Ramón y Cajal's later contributions to the histology of the retina. *Zeitschr. f. Psych. u. Phys. d. Sinnesorgane*, xvi., No. 3, p. 161.

177. STUTZER. On the elastic tissue of the human eye. *Graefe's Archiv*, xlv., 2, p. 322.

ROLLET and JAQUEAU (175) examined forty human eyes, and found that the macula lutea lies from 0.5–1.5 *mm below* a hori-

zontal plane passing through the centre of the optic disc. The distance between the central point of the disc and the macula in the normal eye is 4 *mm*, but in the myopic eye it is greater.

SULZER.

STUTZER (177) has studied the elastic tissues of the eye after orcein staining, which differentiates elastic tissue. The cornea contains no elastic tissue, the sclera contains a considerable quantity, and the ciliary body is especially rich in elastic tissue, which lies about the chamber angle, and on and between the fibre bundles of the ciliary muscle.

V.—PHYSIOLOGY.

178. ROUX. Retino-retinal reflexes. *Arch. d'opht.*, xviii., 6, p. 395.

179. FUKALA. A case of rare absolute color blindness. *Zehender's klin. Monatsbl.*, xxxvi., p. 175.

180. FICK. On cone acuteness of vision and rod acuteness of vision. *Graefe's Archiv*, xlv., 2, p. 326.

181. HEINE. Physiologico-anatomical investigations on accommodation in the eye of the bird. *Ibid.*, 3, p. 469.

182. HUMMELSHEIM. On the effect of the width of the pupil on the acuteness of vision with various grades of illumination. *Ibid.*, 2, p. 357.

183. ABELSDORF. Physiological observations on the eye of the crocodile. *Arch. f. Anat. und Physiol.*, Phys. Abth. 1898, p. 155.

184. FILEHNE. The geometrico-optical illusions as after-effects of the experience gained in corporeal vision. *Zeitschr. f. Psych. u. Phys. d. Sinnesorgane*, xvii., 12, p. 15.

185. TSCHERNING. A personal observation. *Zehender's klin. Monatsbl.*, xxxvi., p. 223.

186. VALK. Does the human cornea change its radius of curvature? *The Post-Graduate*, Dec., 1897.

187. CULBERTSON. Rotation of axis of astigmatism during ophthalmometric examination. *Amer. Journ. of Ophth.*, April, 1898.

The retino-retinal reflexes described by ROUX (178) take place in the retina of one and the same eye. 1. The pigment reflex is a true reflex, illumination and shading of the eye producing a

movement of the pigment among the rods and cones, which ceases after cutting the optic nerve. The centripetal path is the optic nerve, the centrifugal passes probably from the oculo-motor nucleus through the ciliary ganglion and ciliary nerves, and is the same as that for the light reaction of the iris which also is for the same purpose. 2. The second reflex is that of the neurones represented by the horizontal cells and spongioblasts of the inner nuclear layer. The centrifugal fibres arise probably from the corpora quadrigemina, and can be followed into the inner nuclear layer, and probably respond not directly to cortical excitation, but to excitation arising in the retina. V. MITTELSTÄDT.

HEINE (181) finds that accommodation in the eye of the bird takes place in the same manner as in man, although the change in the corneal curvature may be an important factor. The usual refraction of the dove's eye is hyperopia 1.—2. D. Under electrical stimulation accommodation will rise to 12. D, and under the use of miotics to 7.—8. D. The author was able to fix one eye with accommodation paralyzed and the other in active accommodation and examine them microscopically. The conditions found proved that the muscle of accommodation, which acts as a unit, renders tense the zonula in its contraction.

VALK (186) has found that the radius of curvature of the cornea changes from time to time, and tabulates 25 cases where he has found the changes taking place in from 4 months to 4 years. In 4 cases the radius was lessened; in 21 it was lengthened. Usually the astigmatism was not materially altered, though in 1 case it was changed 2.25. D. He thinks that age has the influence of flattening the cornea. The difference he has found to range from 0.10 *mm* to 0.70 *mm* in the radius.

BURNETT.

CULBERTSON (187) has found, in some instances, the eyes to rotate on the antero-posterior axis during an examination with the ophthalmometer, causing the axis of the astigmatism to vary. It has amounted to as much as 15°, and it is usually concomitant —that is, both eyes rotate in or about. BURNETT.

VI.—REFRACTION AND ACCOMMODATION.

188. REDDINGIUS. Increased excitability of the accommodation. A study on muscular asthenopia. *Graefe's Archiv*, xlv., p. 374.

189. VAN FLEET. Atropine in the refraction room. *The Post-Graduate*, Dec., 1897.

REDDINGIUS (188) describes eight cases of so-called increased excitability of the accommodation with corresponding muscular asthenopia. The eyes were emmetropic, and orthophoria for distance existed with marked exophoria for near and asthenopia. All the patients were relieved by wearing weak concave glasses. The author believes that in such cases there is an abnormal relationship between convergence and accommodation—viz., an over-exertion of accommodation. The condition may be artificially produced by instilling weak solutions of eserine.

As a result of his experience VAN FLEET (189) sums up the question of atropine in refraction as follows: where the fitting of glasses is for the relief of defective vision or of asthenopia due to simple refractive error, atropine is seldom indicated.

BURNETT.

VII.—MUSCLES AND NERVES.

190. VIGNES. Repeated muscular advancement. *Arch. d'opht.*, xviii., 6, p. 388.

191. LEDERER. On a case of bilateral conjugate paralysis of the ocular muscles with preserved convergence. Restitutio ad integrum. *Ophth. Klinik*, 1898, 5, p. 84.

192. MEINONG. On wheel rotation, rolling, and aberration. Contribution to the theory of eye movements. *Zeitschr. f. Psych. u. Physiol. d. Sinnesorgane*, xvii., 3–4, p. 161.

193. PAYNE. Insufficiency of the ocular muscles. *Med. Record*, April 9, 1898.

194. FISHER. Bilateral abducens paralysis. *Ophth. Record*, April, 1898.

195. DUANE. When and why shall we operate in insufficiencies of the ocular muscles? *N. Y. Med. Journ.*, Jan. 4–18–25, 1898.

196. HANSELL. Recurring internal ophthalmoplegia. *Ophth. Review*, April, 1898.

To avoid the bad effects of tenotomy, VIGNES (190) advises advancement, which, in extreme cases, he repeats on the same eye rather than on the second. With a resection of 3–4 *mm* of tendon he obtains, according to the amount of Tenon's capsule included

in the suture, 10°–15° or even 20° of effect; and by repeating the operation once or twice a squint of 25°–30° has been corrected. v. MITTELSTÄDT.

The thesis which PAYNE (193) attempts to prove in this paper is that insufficiencies of the oblique muscles are due to a difference in the refraction of the two eyes, and that they do not exist when the refraction is the same. He also contends that when the refraction is the same there is a tendency only to horizontal insufficiency, while where there is a difference in refraction there is a tendency to vertical as well as horizontal insufficiency. A number of cases are cited in proof, and several hundred cases are tabulated. BURNETT.

FISHER (194) reports and figures an interesting case of a perfectly healthy woman who had a paralysis of one abducens thirty-seven years ago, followed by a paralysis of the other abducens beginning seventeen years ago and without any apparent cause. Both corneas are almost hid under the canthi, and the contracture of the interni is so great that the eyes cannot be pulled out under an anæsthetic. The tissues at the inner side seem matted as we find them after panophthalmitis. Pupil cannot be exposed sufficiently for an ophthalmoscopic examination. BURNETT.

In these papers DUANE (195) discusses the question pertaining to muscular insufficiencies, largely from his own experience, and gives the histories, in more or less detail, of 19 cases in support of his conclusions. He expects the operations (tenotomies and advancements) to relieve the following conditions: 1. Any disfiguring deflection of the eyes and the often annoying diplopia that such a deflection may give rise to. 2. Pain, in using the eyes and asthenopia; a sense of weariness and strain. 3. Headaches, migraine, and other reflex pains (not infrequently referred to the occiput or spine). 4. A sense of constant confusion in the head, causing aprosexia and mental hebetude and depression. 5. Vertigo. 6. Digestive disturbance, with impairment of appetite and nutrition and subnormal weight of the body. 7. Chorea (rarely). BURNETT.

HANSELL (196) relates the histories of 4 cases of recurring paresis of the sphincter of the iris and ciliary muscle which were evidently nuclear in their origin, and for which there was no assignable cause. BURNETT.

Sections VIII.–XII. Reviewed by Dr. SILEX.

VIII.—LIDS.

197. KÖNIGSHÖFER. On the operation for lagophthalmus. *Ophth. Klinik*, 1898, 1.

198. GÜNSBERG. Ophthalmological considerations. *Wjest. Ophth.*, 1898, 1.

199. WICHERKIEWICZ. An efficacious operative procedure for the relief of ectropium of the lower lid. *Rev. génér. d'opht.*, 1898, p. 193.

200. STRZEMINSKI. Re-establishment of the ciliary margin in the operative treatment of entropium and of trachomatous trichiasis. *Arch. d'opht.*, xviii., p. 241.

201. GOLDZIEHER. Fibroma of the upper lid with excessive growth of the skin and asymmetry of the face. *Centralbl. f. Augenheilk.*, xxii., p. 174.

202. FEUER. Tarsitis palpebrarum luica congenita, in an infant three months of age. *Ung. Med. Presse*, 1898, 20.

203. LAMBERT. Two cases of restoration of the eyelids by skin flap from the middle of the forehead. *N. Y. Eye and Ear Infirmary Reports*, Jan., 1898.

204. PRINCE. Excision of the tarsus for extreme non-cicatricial entropium of the lower lid. *Amer. Jour. of Ophth.*, May, 1898.

205. MURPHY. An unusual form of hypertrophy of the lids. *Annals of Ophth.*, April, 1898.

206. ALLEMAN. Congenital shortening of the lower lids, colobomata of the upper eyelids. *Ibid.*

KOENIGSHÖFER (197) describes an operation for the relief of lagophthalmus which consists in cutting around the inner angle of the lids and uniting the cut edges in such a way as to secure adhesion of the canthus. In high degrees of lagophthalmus the external canthus is treated in a similar way.

In restoring the lid margin in cases of trichiasis and entropium, STRZEMINSKI (200) makes an inter-marginal incision 5 *mm* deep and inserts into this several bits of mucous membrane from the lip, without suturing. v. MITTELSTÄDT.

In GOLDZIEHER'S (201) case there was found beneath the thickened skin of the upper lid a movable tumor of soft consistency, 7 *cm* x 5 *cm* x 4.5 *cm*. Microscopical examination showed

it to consist of pure connective tissue with a non-inflammatory hyperplasia of all layers of the skin. The condition is not to be confounded with elephantiasis.

In an infant three months of age FEUER (202) made a diagnosis of tarsitis palpebrarum luica congenita. The cartilage was particularly enlarged in the left eye, the convex margin here reaching the margin of the orbit. The lids could only be opened 5 *mm* and eversion of the lower lid was impossible. The infant had rhagades about the mouth, ulcers on the ears, and enlarged cervical glands. The infant soon died and the autopsy showed congenital syphilis. HERRNHEISER.

LAMBERT (203) gives an account of two successful cases of formation of the lids at the inner canthus by a skin flap from the middle of the forehead. The cause of the removal of these portions of the lids was epithelioma. Two pictures illustrate the histories. BURNETT.

For those cases of ectropium of an extreme degree, met with in elderly people, usually with some lacrymal trouble and not due to cicatricial contraction of the skin, PRINCE (204) takes out the entire tarsus of the lower lid. It can be done under cocain anæsthesia. He reports three cases of its successful application. BURNETT.

The peculiarity of MURPHY'S (205) case is that the hypertrophy is limited to the upper and lower lids on the right side and to the right auricle. The increase in substance seems to consist of connective tissue. The weight of the upper lid is such that it is raised with great difficulty. The skin is slightly darker than the rest of the skin of the body. Vision is bad in both eyes: R $\frac{16}{200}$, L $\frac{10}{200}$. The patient is fifty-eight years old. BURNETT.

ALLEMAN'S (206) case was a boy who suffered from a congenital deformity of the lids of both eyes, consisting in a marked shortening of the lower lids and a small coloboma 5 *mm* in breadth in each upper lid a few millimetres from the inner canthus. The lids could not be closed. No other deformity. V = $\frac{20}{20}$ in R, $\frac{20}{30}$ in L. BURNETT.

X.—ORBIT AND NEIGHBORING CAVITIES.

207. ZENKER. A case of penetration of a knife blade through the conjunctiva into the floor of the orbit and retention there for twelve years without the patient's knowledge. *Zehender's klin. Monatsbl.*, xxxvi., p. 132.

208. STOMANN. A contribution to the knowledge of pulsating exophthalmus. Copenhagen, 1898.

209. TEILLAIS. On transitory or intermittent exophthalmus. *Ann. d'ocul.*, cxix., p. 423.

210. OLIVER. Exophthalmic goitre, extreme exophthalmus, and sloughing of both corneas not controlled by extensive and repeated tarsorrhaphies. Thyroid extract administered in high doses without avail. *Annals of Ophth.*, April, 1898.

211. BLAAUW. A case of intra-orbital tumor. *N. Y. Med. Jour.*, May 21, 1898.

212. WOODWARD. A case of pulsating exophthalmus; rupture of the left carotid into the cavernous sinus; cured. *Ibid.*, June 11, 1898.

ZENKER (207) describes the operation for the removal of the knife blade, which fortunately had not touched the eye. After the operation the eye remained free from irritation and had normal vision.

STOMANN (208) gives a résumé of 197 cases of pulsating exophthalmus, 22 of which he calls false, being due to orbital encephalocele, angioma or other vascular neoplasm. Of the 175 true cases 122 were of traumatic origin. The true cases are due to rupture of the internal carotid in the cavernous sinus and aneurism of the ophthalmic artery, the latter being much the rarer cause.

The prognosis, as to life, is good; as to vision, poor; spontaneous recovery is reported in 20 cases. Compression of the common carotid has definitely healed only 8 of the 53 cases so treated. Ligature of the common carotid has been successful in 54 per cent. of cases; the mortality following this operation, however, is 10 per cent., which will probably be lowered with the employment of antiseptic methods. The author suggests ligating the internal carotid and perhaps later the external instead of ligating the common carotid at first. DALÈN.

TEILLAIS (209) reports the case of a married woman, of thirty-five, who within four years had had eight attacks of transient unilateral exophthalmus associated with menstruation. The attacks came on with a feeling of pain and tension in the region of the right eye, followed by chills, nausea, and vomiting. The protrusion of the eye reached its maximum in about ten hours, when V = $\frac{3}{4}$ with H. 1.50. After the subsidence of the attack, vision

and refraction were normal. The exophthalmus was not affected by compression of the carotid. Teillais has seen two similar cases, the exophthalmus occurring at the time of the menopause.

OLIVER'S (210) patient was a woman, of twenty-seven, affected with exophthalmic goitre to such an extent that 4 *mm* of the sclera was exposed above and below between the edges of the lids. There was the usual thyroid enlargement and a mitral murmur. There was limited movements of the balls and contraction of the V. F. F. for form and colors. Soon signs of corneal ulceration set in, and tarsorrhaphy was done in both eyes, and five grains of thyroid extract were given tri-daily. The cornea of both eyes were now opaque and ulcerating. Exophthalmus same. Patient left the hospital, and no further report.

BURNETT.

The tumor of the orbit removed by BLAAUW (211) was a dermoid cyst in the lower-inner portion of the right orbit; no exophthalmus. V = 1. It had no connection with the walls of the orbit. BURNETT.

WOODWARD'S (212) patient was a healthy woman, of thirty-nine, who had a pulsating exophthalmus of the left eye, coming on without an injury. Compression of the left common carotid checked the pulsations and stopped the noises. V = $\frac{5}{20}$. Some retinal hemorrhages. Rest in bed and iodide were used without effect. The cornea becoming abraded, it was determined to ligate the common carotid, after which the symptoms abated but did not entirely disappear. All trouble, however, ceased after a ligation of the collateral vessels some five months later.

BURNETT.

XI—CONJUNCTIVA.

213. FRAENKEL, C. The gonococcus as a cause of diphtheritic inflammation of the conjunctiva. *Hygien. Rundschau*, 1898, p. 313.

214. VALUDE. Pseudo-membranous conjunctivitis due to the streptococcus and panophthalmitis, secondary to an infection with grippe and a complicated labor. *Ann. d'ocul.*, xix., p. 328.

215. GREEFF. Acute eye epidemics. *Berlin. klin. Wochenschr.*, 1898, No. 19.

216. WEICHSELBAUM-ADLER. An epidemic of acute conjunctivitis in Sarasdorf. *Das Oesterr. Sanitätswesen*, Wien, 1897, No. 20.

217. GROS. Autumnal catarrh and trachoma in Algeria. *Rev. génér. d'opht.*, April, 1898, p. 145.

218. SANTOS-FERNANDEZ. Purulent ophthalmia of the newborn in Cuba. *Ann. d'ocul.*, cxix., p. 293.

219. INOUYE. Blennorrhœa infantum. *Centralbl. f. prakt. Augenheilk.*, xxii., p. 108.

220. FEILCHENFELD. On the treatment of gonorrhœal ophthalmia in adults. *Deutsche med. Wochenschr.*, 1898, No. 18.

221. HOOR. Experiments with argentamin as a prophylactic against ophthalmia neonatorum. *Ophth. Klinik*, 1898, No. 3.

222. DARIER. Protargol, a specific for blennorrhœic conjunctivitis. *Ibid.*, No. 7.

223. DEBAGORIO-MAKRIEWITSCH. On the treatment of gonorrhœal conjunctivitis by constant flooding and the simultaneous application of strong solutions of nitrate of silver. *Wjest. opht.*, 1898, p. 1.

224. WOLLFBERG. On the value of formalin in the gonorrhœal conjunctivitis of adults. *Wochenschr. f. Therapie u. Hygiene des Auges*, 1898.

225. GÜNSBERG. Primary epithelioma of the bulbar conjunctiva. *Wjest. opht.*, 1898, No. 3.

226. VAN DUYSE. On a subconjunctival lipo-dermoid of the plica semilunaris. *Opht. Klinik*, No. 6, p. 108.

227. TOCQS. Lymphangiectasia of the bulbar conjunctiva. *Ann. d'ocul.*, cxix., p. 350.

228. SCHAPRINGER. Benign cystic epithelioma (Jaquet) of the bulbar conjunctiva. *N. Y. Eye and Ear Infirmary Reports*, Jan., 1898.

229. GIFFORD. The diplo-bacillus of subacute catarrhal conjunctivitis. *Annals of Opht.*, April, 1898.

230. ALT. Conjunctivitis due to the diplo-bacillus of Morax-Axenfeld. *Am. Jour. of Opht.*, June, 1898.

FRAENKEL (213) in an infant one year old found on the inflamed conjunctiva a firmly attached yellowish-white membranous deposit which was found to be due to an infection with the gonococcus. No other micro-organisms were present. Four similar cases have been reported.

VALUDE (214) records the history of a patient who wore an artificial eye over an atrophic stump. After a severe labor neces-

sitating symphyseotomy and followed by puerperal fever, which took place in the course of an influenza broncho-pneumonia, the atrophic eye exhibited signs of diphtheritic conjunctivitis followed by panophthalmitis. Streptococci were found in pure culture in the sputum, the vaginal pseudo-membranes, the operation wound, the conjunctiva, and the vitreous. Valude believes that the infection of the interior of the eye took place from the conjunctiva through an old scar. SULZER.

GREEFF (215) sketches broadly the clinical picture of follicular catarrh and of trachoma, and describes the various forms of conjunctival catarrh that are caused by micro-organisms. He then calls attention to the fact that many children have innocent follicular swellings, and that the frequently reported epidemics of acute inflammation have nothing in common with trachoma, but are composed of benign cases of catarrhal inflammation.

Within five weeks WEICHSELBAUM and ADLER (216) observed 75 cases of mild epidemic conjunctivitis, 74 cases being in children. All cases recovered promptly, although only a few were treated, sublimate and nitrate of silver being used. The diplococcus of pneumonia was found constantly in the secretion.

GROS (217) has observed in Algiers an acute conjunctivitis appearing in September and October, usually becoming chronic and leading to granulations. He believes that it is not identical with trachoma, for the following reasons: 1. The affection appears at a particular season. The cornea is rarely affected. 2. Children are those most affected. 3. The infiltration of the lid comes on late, and pannus has never been observed. SULZER.

INOUYE (219) means by blennorrhœa infantum, blennorrhœa appearing between the sixth day after birth and the fourteenth year, whether gonococci are present or not. The disease is frequent in Japan and seems to be acquired through the secretion of leucorrhœa or gonorrhœa in the individual himself or those of his family.

HOOR (221) uses argentamin in 3–5 per cent. solution in place of nitrate of silver, since it does not irritate and has other advantages. As a prophylactic against blennorrhœa of the new-born it has not proved successful.

DARIER (222) believes that protargol is a specific in blennorrhœa and lacks the caustic and corrosive properties of silver. Even 50 per cent. solutions may be used without fear of complications, and 5 per cent. solutions are very efficacious when the disease is on the wane.

The tumor in GÜNSBERG's (225) case was situated at the inner angle on the bulbar conjunctiva, had existed for ten months, and was readily removed. After ten months the growth reappeared at the same point, but after the second removal it did not return. It was a typical carcinoma.

In VAN DUYSE's (226) patient, a girl of sixteen, a lipo-dermoid occupied the plica semilunaris. A microscopic report is given, and a description of three cases previously reported.

SCHAPRINGER (228) reports and gives illustrations of a case of tumor of the conjunctiva which he thinks the same as that described by dermatologists under the name of "benign cystic epithelioma." It was in a young woman, and situated on the bulbar conjunctiva, and about the size of a split pea. The appearance of the growth followed a slight inflammation of the tissue. On section it was found to be due entirely to proliferation of the epithelium of the conjunctiva. This layer was thickened, and there were numerous round or oval accumulations of epithelial cells in the connective tissue beneath. These cells showed a disposition to disintegrate and thin cysts were formed. BURNETT.

GIFFORD (229) gives an account of his experience clinically and pathologically with the diplo-bacillus first described by Morax as found by him in subacute and chronic conjunctivitis. He has had a number of cases in Omaha. He finds blood serum the best medium for culture, and the chloride of zinc solution the best remedy for treating the disease. Morax uses the sulphate as does the reviewer who has found the bacillus occasionally in Washington. He also found it in corneal ulcers as has Morax and others. BURNETT.

ALT (230) has had three cases of acute conjunctivitis in which he found only the diplo-bacillus described by Morax and Axenfield, who found it only in the subacute and chronic forms of conjunctivitis. He used in treatment a 1% solution of protargol with excellent effect. BURNETT.

XII.—CORNEA, SCLERA, AND ANTERIOR CHAMBER.

231. SALZER. On artificial replacement of the cornea. Wiesbaden, Bergmann, 1898.

232. GROENOUW. Nodular opacities of the cornea. *Graefe's Archiv*, xlvi.

233. PELTESOHN. Hereditary lues and keratomalacia. *Deutsche med. Wochenschr.*, 1898, 18.

234. AUDREJEW. On hypopyon with purulent keratitis. *Inaug. Dissert.*, St. Petersburg, 1898.

235. HIRSCH. On so-called "recurrent erosion" of the cornea, and its treatment. *Prager. med. Wochenschr.*, 1898, 25.

236. v. REUSS. On recurrent traumatic erosions of the cornea. *Ibid.*, 1898, 21.

237. SCHROEDER. The clinical picture and the treatment of traumatic keratalgia and recurrent erosions of the cornea. *Wjest. ophth.*, 1898, 3.

238. JENSEN. Bullous keratitis. *Arch. d'opht.*, xviii., p. 129.

239. DE GOUVÉA. Operative treatment of adherent leucoma, and of the partial staphyloma resulting from it. *Ann. d'ocul.*, cxix., p. 360.

240. FRIDENBERG PERCY. The formation of vacuoles in corneal epithelium. *N. Y. Eye and Ear Infirmary Reports*, Jan., 1898.

241. ELLETT. A case of tenonitis. *Ophth. Record*, April, 1898.

242. HARLAN. Trophic keratitis with report of a case occurring in caisson disease. *Med. News*, April 16, 1898.

243. VEASEY. A case of hypopyon kerato-iritis occurring in a patient during an attack of typhoid fever. *Ophth. Record*, April, 1898.

Since the results of replacing the opaque cornea with clear cornea from animals have not been remarkable, SALZER (231) has proposed to use a shell of aluminum and glass to cover the cornea after a partial trephining. Four cases have been treated in this way, vision of $\frac{5}{60}$ having been obtained.

In GROENOUW'S (232) case small round or irregular gray discrete nodules developed in the centre of the cornea, elevating the epithelium. They were stationary, and not accompanied by signs of inflammation. Microscopically a deposit was found in the substantia propria of the cornea which was apparantly hyalin.

In experimental hypopyon keratitis in rabbits, caused by inoculation with cultures of staphylococci and streptococci, ANDREJEW (234) found that the pus cells came first from the region of Schlemm's canal and the vessels of the chamber angle and only later from the iris. The cornea takes part in the hypopyon only after rupture of Descemet's membrane.

In his reply to Reuss, HIRSCH (235) adds the report of two

cases of recurrent erosion of the cornea (keratitis bullosa or vesiculosa). Hirsch believes that through injury of the nerve endings in the corneal epithelium a neuritis arises with attacks of severe pain, with or without the formation of vesicles on the cornea. For treatment, besides a bandage and cocaine, Hirsch uses quinine, which he regards as a specific. HERRNHEISER.

REUSS (236) does not agree with Hirsch, and believes that there are two forms of the disease. In the first there is a primary defect which becomes filled with new epithelium which is later mechanically loosened. In the second form there is actually recurring erosion.

SCHROEDER (237) describes cases of the same disease under the name "keratalgia traumatica." He gets speedy relief from touching the eroded spots with 2 per cent. silver solution.

HIRSCHMANN.

JENSEN (238) describes keratitis bullosa as it appears after superficial injury of the cornea—chiefly in women. The treatment consists in removal of the epithelial covering, atropine, and pressure bandage. Cocaine delays the healing. [Holocain deserves a trial.—H. K.] v. MITTELSTÄDT.

From a histological examination and a study of the general question of epithelial degeneration, FRIDENBERG (240) arrives at the conclusion that the vacuoles observed in the corneal epithelium of staphylomatous eyes are not due to the same causes that produce epithelial disturbances in glaucoma. They are most like those found in degenerative conditions of the skin due to inflammatory processes and consequent degenerative changes.

BURNETT.

ELLETT (241) case is interesting from the fact that the tenonitis, which was double, was, so far as could be determined, idiopathic. The patient was a negro girl in otherwise good health There was some corneal inflammation, but the end was recovery.

BURNETT.

HARLAN'S (242) patient was a man who was suffering from caisson disease. There was almost complete anæsthesia of the cornea and conjunctiva and the parts of the face supplied by the fifth nerve on the right side. There was a superficial ulcer on the cornea which spread, and there was hypopyon and iritis. The ulcer healed under treatment leaving a large and dense opacity. After discussing all the theories of neuroparalytic ophthalmia, he finally agrees with Panas that the keratitis in such

cases has its origin in an alteration in the Gasserian ganglion or in the nuclei of the fifth pair, and it is undecided whether it is of a paralytic or irritative nature, or produced through the medium of the sensitive vasomotor or special trophic nerve fibres.

BURNETT.

In the case related by VEASEY (243) the patient had passed the third week of typhoid fever when she was seized with a keratoiritis in the right eye, which went on to an ulceration of the cornea. This healed under the actual cautery and cleansing with formalin solution. BURNETT.

Sections XIII.–XVIII. Reviewed by DR. O. BRECHT.

XIII.—LENS.

244. BLOOM. S. On retrochoroidal hemorrhage after cataract extraction. *Graefe's Archiv*, xlvi., p. 184, with an appended note by SATTLER.

245. RISLEY. Complicated cataract. A clinical lecture. *Annals of Ophth.*, April, 1898.

246. DAVIDSON. Summary of cataract operations done at the N. Y. Eye and Ear Infirmary from Oct., 1896, to Oct., 1897. *N. Y. Eye and Ear Infirmary Reports*, Jan., 1898.

BLOOM (244) examined four eyes in which choroidal hemorrhage had followed extraction for iridectomy and found in all phlebitic or periphlebitic inflammatory processes. In one patient a pulmonary embolism led to death, and the other eye, successfully operated on seven years before, was examined for comparison and in this eye the veins were healthy.

The author therefore holds the disease of the veins to be responsible for the hemorrhage and accepts Sattler's explanation that with the passing off of the action of the cocaine, which contracts vessels, there comes on an excessive dilatation of the veins, which with the existing predisposition leads to rupture. [Choroidal hemorrhage, however, was well known before cocaine came into use.—H. K.]

In those cases of cataract which are demonstrably or supposedly complicated with disease of the inner tunics, RISLEY (245) recommends a preliminary iridectomy as the best operative procedure. The section of the iris, he thinks, has a good influence on the internal disease. BURNETT.

During the year ending Oct. 1, 1897, there were made at the N. Y. Eye and Ear Infirmary (246) 141 operations for cataract. Of these, 75. 71 % were simple; 20.71 % with iridectomy; with preliminary iridectomy, 2.87 %; prolapse of the iris in 11.32 %, which occurred usually within 2.7 days after the operation. Average immediate vision, $\frac{15}{100}$. Ultimate vision: 11. % had $\frac{20}{20}$, 25.92 % $\frac{20}{40}$, only 3.8 % less than $\frac{20}{200}$. One case of intraocular hemorrhage and two of panophthalmitis. BURNETT.

XIV.—IRIS.

247. KLINKOWSKI. A case of foreign body in the iris. *Inaug. Dissert.*, Greifswald, 1898.

248. Fage. Iritis in patients with ozæna. *Rec. d'opht.*, 1898, p. 327.

249. LAGRANGE. Etiology, evolution, and treatment of tuberculosis of the iris. *Ann. d'ocul.*, cxix., p. 347.

250. DUNN. Partial bilateral irideremia; monocular multiple iridodialysis; iridic atrophy; glaucoma. *Annals of Ophth.*, April 1898.

251. BOYD, E. T. Inequality of the pupils observed at an altitude of 10,250 feet. *Journ Amer. Med. Assoc.*, Apr. 23, 1898.

A splinter had flown into the eye of KLINKOWSKI's (247) patient ten years before, and for the last four years the eye had been inflamed. The foreign body, which lay in the iris, was not affected by the sideroscope, and after removal proved to be composed of iron oxyhydrate. There was no siderotic discoloration of the eye, whence the author concluded that the foreign body had entered the eye in this state.

In a patient aged twenty-six, healthy except for an ozæna, FAGE (248) saw a severe iritis develop without any other discoverable cause. Lowenberg's bacilli were found in the nose, in a state of pure culture. Antisepsis of the nasal cavity brought about a rapid recovery from the iritis. SULZER.

LAGRANGE (249), by injecting cultures of the tubercle bacillus into the carotid in rabbits, produced typical miliary tuberculosis of the iris. He believes that primary iris tuberculosis in man is possible. In many cases such a tuberculosis may develop from a limited focus in the lungs or glands, which heals after having brought about the iris tuberculosis. From a clinical standpoint, all these cases must be regarded as primary iris tuberculosis.

Tuberculosis of the iris remains localized to the anterior segment of the eye, since the suprachoroidal space is protected by the ciliary muscle. The lymph spaces, however, are involved early, and this favors general infection. In rabbits, iris tuberculosis, almost without exception, gives rise to general tuberculosis. Lagrange, therefore, enucleates as soon as vision is lost.

SULZER.

DUNN (250) gives an account of extensive iridic changes in a man of thirty-five who had glaucomatous excavation in both eyes, with $V = \frac{3}{60}$ in R.; large objects in L. There was only a remnant of normal iridic tissue left in each eye, but this responded both to light and consensually. In the right there was iridodialysis below and externally. It was not possible to determine whether these changes were congenital or due to the glaucoma. BURNETT.

BOYD (251) has observed an inequality in the size of the pupils, due to mydriasis of one, at Leadville, Colorado, which is 10,250 feet above the sea-level, so frequently that he is forced to regard it as a physiologic symptom, due to the influence of the high altitude on the central nervous system. He thinks high altitudes lead to mydriasis, and the less dilatation of the one may be due to a difference in the density of the radiating muscular fibres. He cites twenty cases. BURNETT.

XV.—CHOROID.

252. EWETZKY. I. Further studies in intraocular sarcoma. II. Sarcoma in atrophic eyes. III. Flat sarcoma of the uveal tract. IV. Circumscribed melanotic sarcoma of the iris. *Wjest. ophth.*, 1898, 2-3.

253. GINSBERG and SIMON. A case of non-traumatic detachment of the choroid and ciliary body. *Centralbl. f. prakt. Augenheilk.*, xxii., p. 161.

254. BERNHARD. A case of abnormal location of the macula and partial coloboma of the choroid. *Arch. f. Augenheilk.*, xxxvii., 1, p. 51.

EWETZKY (252) describes a great number of cases of intraocular tumor, many of them being uncommon forms, and the following one being of unique interest. In 1881, a patient of twenty-five presented a dark-brown, circumscribed tumor in the upper temporal portion of the iris, which had developed from a black spot observed seven years previously. In 1884, the tumor had

extended forward to the cornea and covered half the pupil. It was removed by operation, and proved to be a round- and spindle-celled melanotic sarcoma. In 1895, signs of glaucoma appeared and vision was much reduced, and tumor having been diagnosed the eye was enucleated. Examination then showed that the entire iris and ciliary body had undergone sarcomatous degeneration without any involvement of the choroid. HIRSCHMANN.

BERNHARD (254) describes, in a boy of fifteen, a low position of the macula requiring a visible depression of the line of sight in fixing an object. The optic disc lay also low down and was partially atrophic, and the normal position of the macula was occupied by a coloboma. $V = \frac{1}{2}$. The other eye also exhibited coloboma and atrophy with $V = \frac{3}{200}$.

XVI.—VITREOUS.

255. PURTSCHER. Extraction of copper splinters from the vitreous. *Centralbl. f. prakt. Augenheilk.*, xxii., p. 129.

256. HOOR. Clinical ophthalmological observations. Free floating bodies in the vitreous. *Wiener klin. Wochenschr.*, 1898, No. 17.

257. ZENTMAYER. A case of probable remnants of the sheath of the hyaloid artery. *Annals of Ophth.*, April, 1898.

258. MARLOW. A case of persistent hyaloid artery containing blood. *Ibid.*

PURTSCHER (255) in two cases removed splinters of copper from the vitreous, in one the operation being done a week after the injury, irido-cyclitis having already set in, and obtained useful vision in both.

HOOR (256) describes the case of a man of twenty-two in whose vitreous was a bright green floating body as large as a bean and apparently attached to the retina by three filamentous processes. There was disseminate chorio-retinitis.

The anomaly described and figured by ZENTMAYER (257) consisted in a pyriform white connective-tissue mass springing from the porus opticus, extending into the vitreous upward and towards the m. l. region. In size it was $1\frac{1}{2}$ disc diameter in length and half as broad. From the lower part of the anterior surface there came a conical mass of the same appearance. This, as well as the macular edge of the main mass, was fimbriated. Two stream-

ers came forward into the vitreous—one to the temporal and one to the nasal side, the latter terminating in an oval opacity.

BURNETT.

MARLOW's (258) patient was a girl of sixteen, in whose left eye there was a hyaloid artery passing straight from the centre of the papilla to the posterior surface of the lens, against which it flattened itself into a round disc three or four times larger than the diameter of the vessel. Marked pulsation was seen in the vessel, producing a rhythmical wavy motion along its whole length synchronous with the pulse. $V = \frac{6}{30}$; astig. + 2. 90°.

BURNETT.

XVII.—GLAUCOMA.

259. TERSON. Typical ophthalmomalacia complicated later with glaucoma. *Clinique Ophth.*, 1898, 5, p. 49.

260. PANAS and ROCHON-DUVIGNEAUD. Clinical and anatomical researches on glaucoma and intraocular tumors. Paris, 1898.

261. BERNHEIMER. On the occurrence of glaucoma in aphakic eyes. *Wiener klin. Wochenschr.*, 1898, 17.

262. TERSON and CAMPOS. Researches on the state of general arterial tension in the glaucomatous. *Arch. d'opht.*, xviii., 4, p. 209.

263. AGABABOFF. Note on the pathological lesions in an eye with secondary glaucoma. *Arch. d'opht.*, xviii., 4, p. 217.

264. PARISOTTI. False glaucoma (ophthalmic migraine). *Annal. d'ocul.*, cxix., p. 321.

265. SIDLER-HUGUENIN. The late results of treatment of glaucoma. *Beiträge z. Augenheilk.*, xxxii.

266. JACKSON. Glaucoma and the influence of mydriatics and myotics upon the glaucomatous eye. *Amer. Journ. Med. Sciences*, April, 1898.

The guiding idea which unites the various portions of PANAS's and ROCHON-DUVIGNEAUD's (260) book on glaucoma and intraocular neoplasms is the effort to explain the origin of the increased tension by a careful microscopic examination of eyes in which + tension existed in life.

They believe that the obliteration of the iris angle is a secondary symptom brought about through the variations in tension in the prodromal period, these changes being due to hypersecretion of ocular liquids while the exit-passages are still normal. The

hypersecretion itself is the result of a still unknown material change and not of a functional disturbance. It would appear, however, that the sclerosis of the retinal vessels plays a certain rôle in its production.

"While it is probable that as regards etiology there is but one sort of primary glaucoma, there are surely several sorts of secondary glaucoma." They take up as causes in cases of choroidal tumor, pigment embolism of the iris angle, compression of the venæ vorticosæ, the direct action of the neoplasm upon the iris angle, and the excitation of the ciliary nerves by the tumor, causing hypersecretion. SULZER.

BERNHEIMER (261) speaks of Czermak's hypothesis of the origin of primary glaucoma when the anterior chamber is shallow in the elderly, and when the anterior chamber is deep but inflammatory products lie in the chamber angle, and he reports four cases observed by himself of glaucoma in aphakic iridectomized eyes. In three of his patients, the second eye also was attacked with glaucoma, whence he concludes that the glaucoma in the aphakic eye was primary and independent of the extraction. In one case, the thickened secondary cataract in the region of the coloboma reached the cornea. Bernheimer therefore believes that in eyes predisposed to glaucoma cortical remains or postoperative thickened masses may affect the chamber angle sufficiently to bring about the attack.

Following attacks of migraine, PARISOTTI (264) observed increased tension, arterial pulsation, and concentric contraction of the visual field in a highly myopic, nervous patient twenty-five years of age. The temple and cheek are greatly reddened during the attack. The attacks are periodic, coming on in the night and disappearing with the first meal, but recurring in the afternoon and again passing off after a meal. After three months' observation no cupping of the disc had appeared. The author attributes the ocular symptoms to the migraine. SULZER.

SIDLER-HUGUENIN (265) followed the course of seventy-six private glaucoma patients of Haab's who had been watched for two years or more and arrived at conclusions similar to those described by Schweigger, these ARCHIVES, xx., p. 475. In 91.47 % of inflammatory glaucomas with useful vision before operation, this vision was retained after operation. Anterior sclerotomy and miotics are much less valuable, but are useful in after treatment. In glaucoma simplex sclerotomy is but little behind iridectomy. For

hemorrhagic glaucoma the simplest treatment is the best, and sclerotomy is preferable to iridectomy ; 20 % of cures are reported. The exclusive use of miotics is insufficient in all forms of glaucoma. The author was able to find increased tension at night in ten cases and would explain in this way those cases of increasing excavation with tension apparently normal at the times of examination.

JACKSON (266) is of the opinion that mydriatics will produce glaucoma, at any age, in an eye predisposed to, or on the verge of, a glaucomatous attack. The best treatment of glaucoma called up by any cause is an iridectomy, and it should be advised always. Eserine in many cases helps, particularly where the pupil is still movable, and may be used, under observation, with an iridectomy almost certainly in reserve for a permanent cure. Several cases are given in illustration of this position. BURNETT.

XVIII.—SYMPATHETIC OPHTHALMIA.

267. GROTE. Is resection of the optic nerve a fitting operation for the prevention of sympathetic ophthalmia ? *Inaug. Dissert.*, Berlin.

268. CRAIG. Sympathetic ophthalmia. Report of six cases. *N. Y. Eye and Ear Infirmary Reports*, Jan., 1898.

GROTE (267) collected from the records of the university eye clinic in Berlin all the cases in the years 1882–1897 in which resection of the optic and ciliary nerves had been done for the prevention of sympathetic ophthalmia, and came to the conclusion that sympathetic ophthalmia would not have followed the operation in any of the 352 cases if the resection had been done early.

CRAIG (268) gives a report of six cases of sympathetic ophthalmia which are mainly interesting from their causation. One was a penetrating wound of the ciliary region ; three wounds of the cornea associated with prolapse of the iris ; one followed a simple extraction of cataract with a prolapse of iris on the second day ; one from panophthalmitis following a perforating ulcer of the cornea. In only two cases was vision in the sympathizing eye retained, and both were perforating injuries. BURNETT.

Sections XIX.-XXII. Reviewed by PROF. GREEFF.

XIX.—RETINA AND FUNCTIONAL DISTURBANCES.

269. KRONHEIM. On the results of scleral puncture in detachment of the retina. *Deutsche med. Wochenschr.*, 1898, No. 18.

270. BAUKWITZ. A contribution to the knowledge of unilateral hemorrhagic retinitis. *Graefe's Arch.*, xlv., 12.

271. WARSCHAWSKY. A case of hemorrhage between the retina and vitreous. *Wjest. ophth.*, 1898, No. 3.

272. ABÁDIE. Intraocular hemorrhages in adolescents. *Ann. d'ocul.*, cxix., p. 332.

273. MCCOY and MICHAEL. Alcoholic amaurosis resulting from wood-alcohol poisoning. *Med. Record*, May 28, 1898.

274. STILLSON. Detachment of the retina. Report of five cases operated on by the multiple puncture of the sclera with the galvano-cautery. Four recoveries, one negative result. *Amer. Jour. of Ophth.*, May, 1898.

275. AMOS. Homonymous hemiopia followed by loss of vision in a case of uterine hemorrhage due to fibroid tumor. *Ibid.*, June, 1898.

KRONHEIM (269) reports on 21 cases of detachment of the retina treated in Professor Cohn's clinic by scleral puncture. Patients are first treated in the usual way with diaphoretics, atropine, bandage, and rest in bed, and when this is unavailing puncture is done. In 6 of the 21 cases the operation did not improve the condition, and in two the condition became worse. In 4 there was slight improvement, in 4 others marked improvement, and in 5 recovery.

BAUKWITZ (270) reviews the literature and adds the clinical and pathological report of a case of unilateral hemorrhagic retinitis from the clinic in Jena. In the nerve the central vein was found to be thrombosed, and the artery also showed changes thought to be primary. Enucleation was done because glaucoma followed an iritis with posterior synechiæ that came on.

In WARSCHAWSKY'S (271) case, after severe vomiting a hemorrhage occurred between the retina and vitreous in the macular region, causing vision to be reduced to $\frac{1}{5}$. In six months the hemorrhage had disappeared without leaving a trace and vision had become normal. A *résumé* of the 25 cases previously reported is appended. HIRSCHMANN.

ABÁDIE (272) divides the intraocular hemorrhages of adolescents into the following categories:

1. The acute recurrent hemorrhages of the age of puberty.
2. The dyscrasic hemorrhages.
3. The secondary hemorrhages following chorio-retinitis.

4. The apoplectiform hemorrhages in the retina.

The last variety are almost always localized to one eye. The cause is a disturbance of the sympathetic consisting in a paralysis of the vaso-constrictor fibres. Abádie believes that a maximum dilatation of the vessels may cause a sudden hemorrhage, and on this account his therapy consists in the administration of quinine. SULZER.

This patient (273), aged twenty-one, took 60 c.c. of Columbian spirits (wood-alcohol). Within twenty-four hours he was totally blind. At the end of two weeks there was perception of light. This improved to counting fingers close to the eyes, but nothing better a year after. There was mydriasis, atrophy of both nerves, and some excavation of the discs. Retinal arteries greatly diminished in calibre. BURNETT.

Of the five cases reported by STILLSON (274) in which he used scleral puncture by the cautery for detachment of the retina, one was traumatic; one without a cause (refraction not given); one with $m = 2$ D; one the result of choroidal hemorrhage apparently; and one had 3 D of m. All were relieved except the case with hemorrhage. BURNETT.

In AMOS'S (275) case there was, first, a right hemianopsia complete, as a result of hemorrhage from uterine fibroma; followed later by a complete left hemianopsia accompanying another loss of blood. The centre of the visual field was finally restored. Amos thinks the phenomena due to embolism. BURNETT.

XX.—OPTIC NERVE.

276. DE SCHWEINITZ. Partial optic-nerve atrophy and central scotomas (so-called central amblyopia) apparently due to chronic lead poisoning. *Ophth. Record*, June, 1898.

277. CLEMESHA. Peripheral neuritis, including optic neuritis following lavage of a dilated stomach. *N. Y. Med. Journ.*, June 25, 1898.

DE SCHWEINITZ (276) gives a full history of two cases of partial optic atrophy with central scotomas, in one of which, in addition to the clinical history, evidences of lead were found in the urine; in the other, not. He points out that such atrophy in lead-poisoning is rare. These atrophies are no doubt due to neuritis in some cases, as in his last one, but may come from changes caused by the lead not of an inflammatory character. BURNETT.

In CLEMESHA's (277) case there was a double optic neuritis associated with a general peripheral neuritis in a man of forty-six, who suffered from dilatation of the stomach. The nervous symptoms followed lavage of the stomach, and the author deems the neuritis due to the action of toxines absorbed by the stomach.

BURNETT.

XXI.—INJURIES, FOREIGN BODIES, PARASITES.

278. ROMER. The conservative treatment of perforating wounds of the ball. *Zeitschr. f. prakt. Aerzte*, June 1, 1898.

279. NOBBE. The development of fungi in the vitreous after penetrating injuries; with investigations on aspergillus mycosis of the vitreous. *Graefe's Archiv*, xlv., p. 700.

280. STUTZER. A case of conjunctival tuberculosis following a dog's bite. *Beiträge z. Augenheilk.*, xxx.

281. WICHERKIEWICZ. On foreign bodies in the lens. *Centralbl. f. Augenheilk.*, xx., April.

282. VÜLLERS. Some cases of removal of iron splinters from the eye by means of the electro-magnet. *Deutsche med. Wochenschr.*, 1898, No. 25.

283. VERMES. A successful extraction with the Hirschberg magnet. *Sitzungsbericht d. Budapester Königl. Aerztevereins, Ungarische med. Presse*, 1898, No. 16.

284. OLIVER. Foreign body in anterior portion of the eyeball for eight years. Spontaneous extrusion through the original point of entrance in the corneal membrane; vision never interfered with. *Annals of Ophth.*, April, 1896.

285. COCKS. Gunshot wound of the orbit followed by monocular blindness. *N. Y. Eye and Ear Infirmary Reports*, Jan., 1898.

Perforating wounds of the ball (278) are to be so treated as to prevent the entrance of pathogenic micro-organisms. For this purpose the face and lids are to be thoroughly cleansed and the conjunctival sac washed out with bichloride 1:5000. Small prolapses of the iris may be returned with a spatula if possible; if not, they should be excised. Finally iodoform is to be dusted into the eye and a pressure bandage applied.

In NOBBE's (279) case of perforation of the globe with a knife, a pure culture of the aspergillus fumigatus was found in the vitreous after enucleation.

STUTZER's (280) patient, a boy of five, was so bitten by a dog that a portion of the lower lid was torn off. The wound healed without sutures. Three months later the family noticed that the eye was red and swollen and that the preauricular gland was enlarged. An ulcer appeared at the seat of injury, and the child developed fever and failed in health. Tubercle bacilli being found in the ulcer it was thoroughly scraped and the patient recovered.

WICHERKIEWICZ (281) relates the case of a man of forty, in whose lens a piece of a gun-cap had remained for months without causing irritation or progressive opacity of the lens.

VÜLLERS (282) records four cases of successful extraction of iron splinters by means of Hirschberg's magnet. In one case the presence of the iron could be determined only with the sideroscope of Asmus.

VERMES (283) reports that, in the Jewish Hospital in Budapest, 16 extractions of iron splinters have been attempted with Hirschberg's magnet. Ten cases were successful, and in 6 useful vision was retained. HERRNHEISER.

In OLIVER's (284) case, a piece of metal had entered the anterior chamber eight years before, and from appearances had injured the iris. It now showed itself at the point of entrance, and was causing some irritation. It was removed under cocain with a pair of forceps. Vision had been at no time impaired. BURNETT.

In COCK's (285) case the ball entered the right temple, one half inch below and three-fourth inch behind the external canthus. Immediately there was excessive exophthalmos and blindness. A few days after the optic nerve was still healthy, but soon signs of atrophy appeared. In five weeks the man died, and an autopsy showed that there had been fracture of the apex of the orbit, with pressure on the optic nerve on that side. The ball was found on the posterior part of the roof of the left orbit, which, however, was not fractured. BURNETT.

XXII.—OCULAR DISTURBANCES IN GENERAL DISEASES.

286. PELTESOHN. Hereditary syphilis and keratomalacia. *Deutsche med. Wochenschr.*, 1898, No. 18.

287. BAAS. Syphilitic ocular changes. *Graefe's Archiv*, xlv., p. 641.

288. SAUVINEAU. Lesions of the optic nerve in hereditary syphilis. *Rec. d'opht.*, 1898, p. 274.

289. ANTONELLI. Ophthalmoscopic stigmata of hereditary syphilis. *Thèse de Paris*, 1898.

290. PLANT. Two cases of unilateral hysterical amaurosis. *Ophth. Klinik*, 1898, No. 7.

291. SORGER. Spontaneous hemorrhage from the iris and ciliary body in a patient with leukæmia. *Münch. med. Wochenschr.*, 1898, No. 35.

292. THILLIEZ. Two cases of urticarial chemosis. *Ann. d'ocul.*, cxix , p. 286.

293. KOENIGSHÖFER and WEIL. On a case of cerebral tumor. *Ophth. Klinik*, 1898, No. 10.

294. ELSCHNIG. Visual disturbances in lead poisoning. *Wiener med. Wochenschr.*, 1898, 27-29.

295. BORSCH. On a case of amblyopia and on a case of bilateral amaurosis after hematemesis. *Ann. d'ocul.*, cxix., p. 272.

296. PARISOTTI. Considerations on toxic amblyopia. *Soc. franç. d' opht.*, 1898 ; *Ann d'ocul.*, cxix., p. 381.

297. ANTONELLI. Optic neuritis and chorio-retinitis pigmentosa, following the pernicious fever of warm countries. *Rec. d'opht.*, May, 1898, p. 277.

298. HILBERT. Colored vision after influenza. *Zehender's klin. Monatsbl.*, xxxvi.

299. KOENIGSHÖFER. A case of xanthopsia. *Ophth. Klinik*, 1898, No. 6.

300. WOODS, HIRAM. Ocular symptoms in tabes dorsalis. *Ophth. Record*, June, 1898.

PELTESOHN (286) believes that the connection between keratomalacia and hereditary syphilis is not sufficiently recognized. In two cases of keratomalacia in infants, the author had surprising results from the use of mercurials.

BAAS (287) describes in detail the changes found in a number of infants' eyes.

SAUVINEAU (288) regards optic neuritis and post-neuritic atrophy as characteristic signs of hereditary syphilis, while, in opposition to Antonelli, he believes that the scleral ring stands in no relation to hereditary syphilis. The atrophic chorio-retinitic

patches and congenital retinitis pigmentosa are regarded as characteristic signs of hereditary syphilis, but the other anomalies of pigmentation are of no other significance than as stigmata of degeneration. SULZER.

ANTONELLI (289) in his paper on the ophthalmoscopic symptoms of hereditary syphilis gives a résumé of what has previously been written, and adds new facts from his own observation. The most frequent symptoms are discoloration of the optic disc, a choroidal ring, dilatation and irregularity of calibre in the retinal veins, narrowing of the arteries, anomalies of pigmentation, hyperopia with lessened acuteness of vision, unilateral myopia, and squint. SULZER.

Hysterical amaurosis is difficult to distinguish from simulated amaurosis. PLANT (290), therefore, would make the diagnosis hysteria only when other symptoms of this affection are found. In one of his cases, a girl of twenty-one became suddenly blind in one eye, but cutaneous anæsthesia was found. In another, a girl became blind in one eye while carrying a bucket of water on her head, but she had previously had temporary aphasia.

SORGER'S (291) patient developed a tumor of the spleen, and later his lymph glands became enlarged throughout the entire body. Later the anterior chamber of one eye became half filled with blood.

THILLIEZ (292) records two cases in which urticaria affected the eyes. In one, the patient complained that for a week she had noticed that three or four times in the day the eye suddenly became red and greatly swollen. The redness disappeared in fifteen minutes, the swelling lasted an hour. The conjunctiva became very chemotic. These attacks corresponded to attacks of general urticaria. The other patient had suffered for years with urticaria of gastro-intestinal origin, when suddenly one evening the eyes began to twitch and became red and swollen, the chemosis being so marked that the attending physician made scarifications.

SULZER.

In KÖNIGSHÖFER and WEIL'S (293) case the ophthalmoscopic signs of stoppage of the central artery appeared in one eye, and later in the other. At the autopsy a tumor as large as a hen's egg was found, which had destroyed the left optic nerve and the chiasm.

ELSCHNIG (294) describes the various sorts of ocular disturbance due to lead poisoning. Sixteen cases of ocular muscle

paralysis have been reported. No part of the visual tract seems to escape. Intraocular neuritis is frequent, retrobulbar neuritis with central scotoma less so. Spasm of the retinal vessels producing ischæmia of the retina is also met with. When the vision is failing rapidly, local treatment must be employed. If vascular spasm persists, massage should be tried, or a paracentesis done. In other forms of visual disturbance, lumbar puncture should be considered, since this relieved in a marked way the lead encephalopathies.

HILBERT'S (298) patient was a man of thirty-eight who had suffered for a month with influenza. He then had attacks of dizziness, and now all objects appear as blue as if he were looking through a blue glass. V. = $\frac{20}{50}$ each. Ophthalmoscopically, normal. The blue vision is doubtless of central nature.

KÖNIGSHÖFER'S (299) patient, a boy of thirteen, suffered from xanthopsia. The only cause discoverable was intestinal worms, and the trouble disappeared after the use of santonin.

After a general consideration of the connection between tabes and syphilis with eye affections, and especially muscular paralyses, WOODS (300) gives the history of two cases in illustration. *Case* 1.—A woman of thirty-two, left mydriasis with temporary paresis of the left ciliary, internal and inferior recti, impairment of right lev. pal. sup., and sup. rectus ; later development of Argyll-Robertson pupil and tabic symptoms. *Case* 2.—A man of thirty-eight, unilateral (left) accommodative paresis, permanent. In four months rapid optic-nerve atrophy, paracentral scotoma and a year later a commencing atrophy of the left nerve, right myosis, slow development of Argyll-Robertson pupil. BURNETT.

REPORT OF THE TRANSACTIONS OF THE SECTION ON OPHTHALMOLOGY AND OTOLOGY OF THE NEW YORK ACADEMY OF MEDICINE.

By Dr. W. B. MARPLE, Secretary.

MEETING OF OCTOBER 17, 1898, THE PRESIDENT, DR. E. GRUENING, IN THE CHAIR.

Dr. CARL KOLLER presented a family (mother and two children), all exhibiting **congenital distichiasis**. In all three there exists on each lid a second row of ciliæ besides the normal one. They spring from the free margins of the lid in front of the stomata of the Meibomian glands. The row is complete from one end of the lid to the other. The eyelashes are finer than the normal, somewhat stronger on the outer half of the lid. Their direction is parallel to the eyeball, with which they are in continual contact. In all three individuals moderate irritation owing to the brushing by the eyelashes against the globe is present, but very much less than is seen in pathological distichiasis. Koller endeavored to remove the supernumerary row of ciliæ in the elder child by electrolysis. The ciliæ returned. Later he has resorted to individual electrolysis of each hair. For the origin of this malformation, evidently a very rare one, no satisfactory explanation can be offered. Koller then made some remarks on the embryonal formation of eyelids and ciliæ.

Dr. WEBSTER said that a good plan very often is to take away the outer row and then turn the inner row out.

Dr. GRUENING said that this would depend on the kind of lashes on the inner row.

Dr. KOLLER said that the best row was in front.

Dr. W. B. MARPLE presented a case of **symblepharon, following a burn on which he had performed syndesmoplasty.** The lower lid was adherent to globe, covering two

thirds of cornea, and the motility of the eye was greatly restricted. The case was more difficult to manage from the fact that it had already been operated on elsewhere unsuccessfully three times. The lid was dissected away from the globe, securing a fornix of normal depth and restoring normal motility. Then a glass shell was introduced and the eye bandaged. The following day a Thiersch graft from the arm was introduced over the shell and the eye bandaged. The shell was left in four days, when the patient complained of pain, and, on opening the eye, the pain was seen to be due to a corneal infiltration visible through the transparent glass of the shell, and caused by the pressure of the latter upon the cornea. The shell was then removed and the eye rebandaged. No effort was made to examine the parts till about the twelfth day, when the graft was found to have taken, and the condition to be surprisingly improved. There is quite a deep fornix, and the motility of the eye is very little restricted. There is a very small band towards the inner canthus which will be subsequently treated in a similar manner when the result promises to be most satisfactory.

Dr. T. R. CHAMBERS said he was surprised that Dr. Marple succeeded in removing the shell in four days without disturbing the graft. He had always left his in much longer.

Dr. MAY said that he had a case which he hopes to show at the next meeting. He had operated so as to enable the patient to wear an artificial eye. The result in the upper lid was beautiful; in the lower lid it was very fair, though he had to operate several times. The globe was entirely united to the lids. Now the patient can wear an artificial eye. The operation is very tedious, and requires much patience. He had to have a large shell made to entirely fill up the space.

Dr. E. FRIDENBERG said that he had used a Thiersch graft, covering only the globe, however, and attaching graft by means of sutures. The result was good. Thought that it might be advantageous to employ this method instead of a shell, and thus avoid ulceration of the cornea.

Dr. GRUENING said that he could corroborate the description of Dr. May. The patient could now use an artificial eye nicely. Where the eye is lost there is no objection to the use of a shell.

Dr. MARPLE showed the case of **pemphigus conjunctivæ** (previously exhibited to the Section) to show the progress the disease had made.

Dr. R. DENIG showed a case of **argyriasis** in a man who had **used a five per cent. solution of protargol for four months,** instilling one drop t. i. d., although he had told patient to return in four days. The case was interesting as it had been claimed that such a result did not follow the use of this remedy.

Dr. D. WEBSTER said that protargol had been employed at the Manhattan Eye and Ear Infirmary, but that it has been given up. He has used argonin, however, in acute conjunctivitis, and it has given him better results than anything else dropped into the eye t. i. d. In one case he used it with beneficial results in a mild case of purulent conjunctivitis. In solution it keeps only a few days.

Dr. GRUENING, referring to Dr. Denig's case, asked whether we ought not to use the same precautions in the use of protargol (or argonin) as in that of nitrate of silver. If we gave the latter to a patient to use t. i. d. for several months, we would expect argyriasis.

Dr. M. L. FOSTER read a paper on **congenital irideremia** (published in full, these ARCHIVES, Nov., 1898).

Discussion: Dr. H. KNAPP said that he has seen some few cases, but never went into the details of their condition. They are remarkably free from intraocular changes, and he has seen cases where the sight was quite good. He thought that they were an loagous to conus inferior, *i. e.*, coloboma of sheath of optic nerve.

Dr. HEPBURN said that some of these cases might have a good ciliary muscle with deficiently developed iris.

Dr. A. E. DAVIS said that he had seen four cases in all, one of the cases of Dr. Foster's more recently. The astigmatism has changed during the last year, possibly due to tilting up of lens.

Dr. GRUENING had recently seen a case of coloboma of the iris in a child associated with coloboma of the choroid and sheath of the optic nerve and confined to one eye.

Dr. R. DENIG had seen a family, mother and three children, with aniridia. The mother had cataract on which he had operated successfully. Dr. de Beck, of Chicago, had reported several similar cases. In some operated upon for cataract the eyes were lost from cyclitis following prolapse of vitreous.

Dr. R. DENIG read a paper on the **histology and etiology of lenticonus posterior** (with microscopical specimens). There was the complication of a total anterior cataract which was separated by perfectly normal fibres from the degenerated central

parts of the lens. There was no persistence of the hyaloid. The posterior capsule was ruptured. It is not probable that the hyaloid has anything to do with the cause of posterior lenticonus; it seems to be not its cause, but rather its effect. As to its etiology, it is probable that abnormalities in the ectoderm in fœtal life produce anomalies of the lens. As regards the nomenclature, cases where the capsule has not been ruptured ought to be called lentiglobus, while the name lenticonus should be retained for cases where the capsule has been ruptured. Cases would probably be observed more frequently if the lenses were not so often cataractous.

Dr. WEBSTER referred to his case of lenticonus, the first on record, but Dr. Knapp had first made the diagnosis. The case looked like conical cornea. He sent the patient to Dr. Knapp with a note which the latter returned, having made the proper diagnosis.

Dr. KNAPP replied that the case was Dr. Webster's, his former pupil, who had been so kind as to send the patient to him. He felt convinced that Dr. Webster would have made the diagnosis himself when he saw the patient again, and therefore he had asked Dr. Webster to omit his name in the publication.

Adjourned.

BOOK NOTICES.

I. **Report on the Ophthalmic State of the Poor-Law Children in the Metroplis.** By SYDNEY STEPHENSON, Esq., M.B. London, 1897. Price *2s.* 3½*d.*

This report, a folio of 239 pages, presented to both Houses of Parliament by command of her Majesty, is an honor to the author as well as to the British nation. It shows with what care all phases of life are dealt with in England. The book is an exposition of the health of the eyes of children, based on a systematic and extensive examination of public and private educational and eleemosynary institutions, especially the schools of the poor. It gives the percentage of diseased eyes among the inmates, the nature of the affections, in particular acute and chronic purulent ophthalmia, muco-purulent conjunctivitis (acute epidemic catarrh), trachoma, and their consequences as to damage of sight; furthermore, it describes the sanitary condition of these institutions, and recommends desirable improvements, specified for each establishment. We cannot enter into the details of the admirable and exhaustive report, but would recommend it for earnest study to the officers of similar institutions in this and other countries, as well as for the boards of managers and surgeons of ophthalmic hospitals, to whom Mr. Stephenson's labor will be a gift more useful than many received from their patrons.

H. K.

II. **Gesichtsstörungen und Uterinleiden.** Von Prof. Dr. A. MOOREN, of Düsseldorf. Zweite umgearbeite Auflage. Wiesbaden: Bergmann, 1898.

In this edition (106 pages in octavo), enlarged by several new chapters, the author has added the result of the last seventeen years to his experience in the edition of 1881. The influence of the peculiar constitution of women on the visual organ, during

the different periods of her evolution and involution, are described in detail, and with critical remarks on the statements of other authors. These descriptions and the rules for systemic and local treatment, coming from a keen observer and most experienced clinician, will be appreciated by every ophthalmic practitioner.

H. K.

III. **Das Sideroscop u. seine Anwendung.** Von Dr. EDUARD ASMUS. Wiesbaden : Bergmann, 1898. 88 octavo pages, with four lithographic plates. M. 2.40 ($0.60).

The object and principle of this instrument, to determine the presence and seat of iron bodies in the eye, are known to our readers. The very neatly gotten-up brochure gives a detailed description of the exceedingly delicate apparatus and the way of using it. Its publication is opportune, the instrument being a desirable supplement to the different forms of magnet, the value of which is becoming more evident from year to year.

H. K.

IV. **Über der Verwertbarkeit der Bindehaut in der practischen u. operativen Augenheilkunde** (On the Use of the Conjunctiva in Eye-Surgery). Von Dr. HERMANN KUHNT, Prof. an der Univ. Königsberg. 149 large-octavo pages with twenty-two text figures. Wiesbaden : Bergmann, 1898. M. 4.60.

The fertile and versatile author introduces his monograph as follows : "The following leaves are intended systematically to present a therapeutic procedure which the writer may well consider as his mental property." It consists in covering defects in the cornea and sclera with conjunctiva, be they defects produced by ulceration, complicated, or not, with prolapses, fistulas, keratoceles, etc., by simple or complicated wounds of the sclera and cornea, or by surgical operations. His judgment and description are based on the observation of several hundred cases, treated during the last fifteen years. The indications, the rules and precautions, and the results are carefully detailed and exemplified by numerous case histories. The reviewer appreciates the observations and studies of the author, but he, as everybody, knows that scleral wounds from injuries and operations have been closed by conjunctival sutures very many years ago, and he, resting on his own experience, thinks that the necessity, nay even the advantage, of such sutures has been overrated.

The reviewer has no experience in conjunctival covering of corneal ulcers, but thinks this procedure may be of great value,

particularly in neuro-paralytic keratitis, and most chronic and unclean ulcers show absence or diminution of sensibility. In such cases the conjunctival flap may serve no worse, perhaps a better, purpose than the closure of the eye by a compressive bandage or stitching up the palpebral fissure. Kuhnt, page 9, warns us that in ulcers of the cornea a cleansing, as nearly ideal as possible, should precede the conjunctival keratoplasty. In corneal abscess K. removes the anterior wall, cleanses the ulcer, and implants a pedunculated or unpedunculated piece of conjunctiva. He wants this piece to unite permanently with the cornea, being a keratoplasty not with the same but a kindred tissue (p. 144). In cataract operations K. uses the conjunctiva : (*a*) when the final closure of the wound is too protracted ; (*b*) in prolapse of the iris by some cause or other ; (*c*) in infection of the flap, and its consequences.

These extracts may suffice to draw attention to the wide and, doubtless, in many respects fertile field of which the author's monograph gives such a clear, elaborate, and attractive picture. Though it may here and there be overdrawn, the cautious reader will derive great satisfaction and instruction from the multitude of important observations and practical remarks which cannot fail to leave a stimulus in his mind to test the truth of the author's assertions by repeating his work. The reviewer, although not prepared to follow the author's guidance everywhere, and rather inclined to let Nature have her own way where he has seen her do good, will certainly try a number of the author's methods.

H. K.

V. **Über den künstlichen Hornhautersatz.** (The Artificial Restitution of the Cornea.) By FRITZ SALZER, Munich. 65 octavo pages, with 1 plate and 13 text figures. Wiesbaden : Bergmann, 1898. M. 1.80.

The reviewer had been of opinion that keratoplasty for improvement of sight was a "dead issue," but before him is a recent serious monograph on the same subject, with a critical historical review of what has been tried and accomplished, or rather tried and failed to accomplish, in that line of work, with new experiments and a few new operative cases, none of them being anything like a success. Though the author concludes that the possibility of a permanent artificial restitution of the cornea with good optical result is not quite unobjectionably demonstrated by his observations, yet success for a number of years may be ex-

pected in well selected cases. Despite this faint hope of practical benefit, the reader will be indemnified for the time spent in reading the well written monograph by a clear exposition of many important points in pathology and experimental surgery.

H. K.

VI. **The Ophthalmoscope. A Manual for Students.** By GUSTAVUS HARTRIDGE. 158 small-octavo pages, with two colored and two black plates, and 68 illustrations. Third edition. Philadelphia: P. Blakiston, Son, & Co., 1897.

This short and very elementary guide can be heartily recommended to the young ophthalmoscopist. Clearness, precision, and omission of all that is not essential distinguish this neat compendium. Its price, $1.50, is a little more than the average rate of school books. H. K.

VII. **Traité d'Ophtalmoscopie.** By ETIENNE ROLLET, Lyons. 379 small-octavo pages, with 50 chromo-lithographs and 75 text figures. Paris: Masson & Co., 1898.

This is an excellent text-book of ophthalmoscopy for the advanced student, and not at all below the horizon of the adept. It is reasonably complete. The 50 colored plates constitute an ophthalmoscopic atlas, which, together with the exposition of the optical foundation and the technique of ophthalmoscopy, supplemented by the description of what the eye mirror reveals, makes this treatise an elaborate monograph on the diagnosis and pathology of the intraocular affections. The handy, middle-sized volume will be read with delight and benefit by every ophthalmic practitioner. H. K.

VIII. **Atlas der äusseren Erkrankungen des Auges, nebst Grundriss ihrer Pathologie und Therapie.** By Prof. O. HAAB, of Zurich. 228 small-octavo pages, with 76 colored and 6 black illustrations. Price, M. 10 ($2.50).

This is the counterpart of the same author's very popular atlas and *précis* of ophthalmoscopy. It is well worth reading, and, like the atlas, exceedingly priceworthy, but it will not assist the learner as much in the diagnosis of external eye diseases as the atlas does in the diagnosis of the internal. In external diseases nothing can replace the immediate clinical examination by good daylight. The book begins with a chapter on the examination of eye patients, 69 pages, and then describes the affections of the lacrymal organs, the lids, conjunctiva, cornea, sclera, iris, and ciliary body, lens, vitreous and orbit, and glaucoma. H. K.

IX. **Atlas of External Diseases of the Eye.** By A. MAITLAND RAMSAY, M.D. Glasgow: Jas. Maclehose & Sons; New York: The Macmillan Co., 1898. Price, $16.

This is a work of great beauty: 195 folio-pages with 30 full-page colored plates, and 18 full-page photogravures. The illustrations are unrivalled, many of them masterpieces in their kind. The text gives connected descriptions of the diseases, supplementing the stages and phases not presented in the illustrations. It is prepared with the utmost care as to precision and comprehensiveness of language. The book is written for the observing and thinking student, describing the etiology, symptomatology, and pathology of the diseases, but omitting the treatment. The whole work, which in care of preparation and elegance of getting-up appeals, in contrast with the book of Haab, to a select class of readers, is an ornament to Scotch ophthalmology, and in particular to Glasgow, the place from which emanated the best "practical treatise on the diseases of the eye" before the discovery of the ophthalmoscope, the classical text-book of William Mackenzie. H. K.

X. **Handeling by het Oogheelkundig Onderzoek.** (Technique of Ophthalmic Examination.) By Dr. H. SNELLEN, Jr. 109 large-octavo pages, with 68 drawings. Groningen: Walters, 1898.

This very well written compendium reflects the simplicity, precision, and brilliancy of the classical school of Donders, of which the author and his father are the direct successors. It is gratifying to go over a book in which positive knowledge crowds out non-demonstrated novelties, however plausible they may appear. H. K.

XI. **Oogheikundige Verslagen en Bydragen,** uitgegeven met het Jaarverslag van het Nederlandsch Gasthuis voor Ooglyders, No. 39. Utrecht, 1898.

A middle-sized octavo volume containing the annual reports of the Dutch ophthalmic institutions, supplemented by scientific contributions. These publications are not in the regular book-trade, but are sent to libraries and ophthalmologists who take an interest in Dutch literature. The contributions of general importance are usually published also in German, French, or English. They do credit to the famous little kingdom of the Netherlands. H. K.

XII. **Anleitung zur microscopischen Untersuchung des Auges.** By Prof. R. GREEFF. A small-octavo volume of 77 pages, with 5 figures. Berlin: Hirschwald, 1898.

This little, neatly gotten up volume contains a description of the apparatus and methods for macroscopic and microscopic examinations of the visual organ, in all their detail, and according to the newest standpoint. Such a guide will be highly welcome to the ophthalmologist who wants to keep himself well informed by personal practical work in the scientific part of his specialty, though he cannot devote so much time to it as the professional investigator in the laboratory. H. K.

XIII. **Pathologie des Auges.** Bericht über die Jahre 1895 und 1896. By TH. AXENFELD and A. E. FICK. Chapter of Lubarsch u. Ostertag's *Ergebnisse der allegm. Path. u. path. Anat. der Menschen u. der Thiere.* Third year. For 1896. Pp. 525–685. Wiesbaden: Bergmann, 1898. Reprint No. 5.

An excellent, critical report on the progress in scientific ophthalmology, with a complete bibliography. It contains: 1. Bacteriology and parasites of the eye; infectious eye diseases: (*a*) ectogenous, (*b*) endogenous infections. 2. Eye affections connected with general affections. 3. Retinal tumors. 4. Malformations. H. K.

XIV. *Section* XI.—**Ophtalmologie du xii Congrès international de médecine de Moscou.** 1898.

This octavo volume, of 354 closely printed pages, contains the full translations of the ophthalmological section of this very remarkable convention. The volume, full of instructive papers and discussions, will not only be a gratifying souvenir to the attendants of the Congrès, but interesting and instructive reading to those of our colleagues who have not been able to visit the old Russian metropolis. The volume was prepared by the two presidents, Prof. A. A. KRUKOV and Prof. THEO. O. EVETZKY, and the secretary, Dr. S. S. GOLOVINE (address: Clinique ophtalmologique de Moscou). H. K.

XV. **Die Neurologie des Auges. Ein Handbuch für Nerven- und Augenärzte.** (The Neurology of the Eye. A Cyclopædia for Neurologists and Ophthalmologists.) By D. H. WILBRAND, Eye Specialist, and Dr. A. SÄNGER, Nerve Specialist, at Hamburg, Germany. Wiesbaden: Bergmann, 1899.

This first half of the first volume of the above work, a large-octavo volume of 406 well printed pages, with 63 text illustrations, contains a bibliography of 564 references ; the anatomy, physiology, and pathology of the eyelids, 61 pages ; the spasm of the elevator muscle, 4 pages ; and the paralysis of the elevator muscle (ptosis), 335 pages. At first glance it seems impossible to write 335 pages on the symptom ptosis, and yet the perusal of the book shows that there are no repetitions, no prolixity of style, but, on the contrary, an evident tendency toward condensation. And this is not all : according to the prospectus the greater part of the second half of the volume will still be devoted to the same subject. Nothing in the whole literature of the subject seems to be omitted. The more important questions, besides the general discussion, are supplemented by synoptical tables of the published cases. The work is calculated to fill four volumes. Volume ii. will contain the pupils ; Vol. iii., retina, optic nerve, hemianopsia, etc., and the functional nervous disturbances ; Vol. iv., the muscular errors of the eye ; the whole to appear in the course of three years.

Medical cyclopædias are now in fashion ; no doubt they are of great service as reference handbooks in rare cases and obscure or new subjects, both for the practitioner and the investigator. The work under consideration is destined to collect all that is worth knowing on the border line of two important and highly cultivated departments of medicine, the nervous system, and the organ of the highest sense. The happy co-operation of two investigators, each an authority in his field, living in the same town, and enjoying unrivalled hospital facilities, cannot but produce a work of the highest order. H. K.

XVI. **Diseases of the Eye. A Handbook of Ophthalmic Practice for Students and Practitioners.** By G. E. De Schweinitz. Third, thoroughly revised edition, 696 octavo pages, with 255 illustrations and two chromo-lithographic plates. Philadelphia : W. B. Saunders, 1899.

The author shows also in this edition how earnestly and successfully he endeavors to keep his popular text-book (three editions in six years) abreast of advancing science. The bacteriology of the conjunctiva and cornea, so zealously cultivated during the last years, has received particular attention. Other subjects, *e. g.*, the Röntgen rays, eucaïn and holocaïn, the diseases of the sinuses, and the treatment of insufficiencies, have been added or considerably changed. H. K.

XVII. **The Crystalline Lens System.** Its Embryology, Anatomy, Physiological Chemistry, Physiology, Pathology, Diseases, Treatment, Operations and After-changes, with a consideration of Aphakia. By LOUIS STRICKER, M.D. Cincinnati, O., 1899. A volume of 599 pages in octavo. New York : Lemcke & Buechner (812 Broadway).

The first 414 pages of this book are essentially a literary compilation, with extensive reproductions, from various authors, chiefly Otto Becker. The rest of the book is a bibliography of 3433 publications and an index of subjects. The typography and proof-reading leave much to be desired. The book contains a vast amount of subject-matter, and can be recommended as a large repository of valuable information. H. K.

CONTENTS OF VOLUME XXVIII., NUMBER 2.

PAGE

1. The Pathology of the Amblyopia Following Profuse Hemorrhage and of that Following the Ingestion of Methyl Alcohol, with Remarks on the Pathogenesis of Optic-Nerve Atrophy in General. By Dr. **Ward A. Holden,** New York. (With two figures on Text-Plate VIII.) 125

2. The Introduction of Iodoform into the Anterior Chamber of the Eye in Tubercular Iritis. By **N. J. Weill,** M.D. 135

3. A Case of Melano-Sarcoma of the Choroid. By **Matthias Lanckton Foster,** M.D., of New York 146

4. Electro-Magnets for Use with the 110-Volt Direct-Current Lighting Circuit. By **A. B. Kibbe,** M.D., Seattle, Washington . . 148

5. Clinical Contributions. The Bicycle as a Cure for Exophoria—Papillitis Observed in the Process of its Development—Aniridia Traumatica—Traumatic Partial Paralysis of the Oculo-Motor Nerve—Two Cases of Extraction of a Piece of Steel from the Eye by the Giant Electro-Magnet. By Dr. **Kaspar Pischel,** San Francisco, Cal. 153

6. Clinical Observations on a Case of Partial Incomplete Coloboma of the Iris. By Dr. **Arthur Gloor.** Translated and Abridged by MATTHIAS LANCKTON FOSTER, M.D., New York 158

7. Two Cases of Iridotomy under Discouraging Conditions. By Dr. **F. M. Wilson,** Bridgeport, Conn. (With a figure on Text-Plate IX.) 164

8. Clinical Experience with Haab's Powerful Electro-Magnet. By Dr. **Herman Knapp** 167

9. Restoration of the Conjunctival Cul-de-sac in a Case of Total Symblepharon, by Means of Thiersch Skin Grafts. By **Charles H. May,** M.D., New York 182

10. The Law of Listing and Some Disputed Points about its Proof. By **Carl Weiland,** M.D., Philadelphia. (With two figures in the text) 191

PAGE

11. Report of the Transactions of the Section of Ophthalmology and Otology at the New York Academy of Medicine. By Dr. **J. Herbert Claiborne,** Secretary 200

I.—Ophthalmological part of the meeting of January 16, 1899:

Dr. **Walter B. Johnson.** Portable magnet for removing iron foreign bodies from the interior of the eye, 200.

Dr. **Arnold Knapp.** Extensive empyema of the frontal and ethmoidal sinuses with exophthalmos according to Jansen's method, 200; Blepharoplasty, 200.

Dr. **A. E. Davis.** Blepharoplasty for epithelioma of each lid of the left eye, 200.

Dr. **Rudolph Denig.** Varicose veins of the orbit, 201.

Dr. **S. M. Payne.** Artery projecting into the vitreous humor, 201.

Dr. **Wilbur B. Marple.** Thiersch graft in the lower conjunctival sac, 201.

Dr. **E. S Thompson.** Leukosarcoma, 201.

Dr. **Henry D. Noyes.** Muscular insufficiency, 201.

II.—Meeting of February 20, 1899:

Dr. **H. Knapp.** Case of purulent cyclitis, 206; Case of cholesterinic degeneration of an eye from which a chip of steel had been extracted with a magnet ten years before, 206.

Dr. **W. E. Lambert.** Case in which he had relieved a very acute attack of glaucoma, resulting from an extensive incarceration of the iris, by making an anterior sclerotomy, 207.

Dr. **J. E. Weeks.** Case of partial atrophy of the optic nerves due to prolonged uterine hemorrhage, 207.

Dr. **J. H. Claiborne.** Operation for symblepharon, 208; Lower lid of right eye struck by a buck-shot from a toy rifle, 208; Specimen of melano-sarcoma, 209.

Dr. **Ward. A. Holden.** Pathology of the amblyopia following profuse hemorrhage and of that following the ingestion of wood alcohol, as determined experimentally, 209.

12. Systematic Report on the Progress of Ophthalmology in the Third Quarter of the Year 1898. By Dr. **St. Bernheimer,** in Vienna; Dr. **O. Brecht,** Prof. **R. Greeff,** Prof. **C. Horstmann,** and Prof. **P. Silex,** in Berlin. With the assistance of Dr. G. Abelsdorff, Berlin; Dr. S. M. Burnett, Washington; Dr. Dalén, Stockholm; Dr. Herrnheiser, Prague; Prof. Hirschmann, Charkow; Dr. Krahnstöver, Rome; Dr. P. von Mittelstädt, Metz; Prof. Da Gama Pinto, Lisbon; Dr. Richard Schweigger, Berlin; Dr. Sulzer, Paris; Dr. L. Werner, London; Dr. C. H. A. Westhoff, Amsterdam; and others. Translated by Dr. WARD A. HOLDEN. 211

A.—Prof. C. HORSTMANN. General ophthalmological literature, 211; General pathology, diagnosis, and therapeutics, 212; Instruments and remedies, 216.

B.—Dr. ST. BERNHEIMER. Anatomy, 219; Physiology, 221; Refraction and accommodation, 223; Muscles and nerves, 224.

C.—Prof. P. SILEX. Lids, 226; Lachrymal apparatus, 227; Orbit and neighboring cavities, 228; Conjunctiva, 231; Cornea, sclera, and anterior chamber, 234.

D.—Dr. O. BRECHT. Lens, 236; Iris, 237; Vitreous, 238; Glaucoma, 239; Sympathetic ophthalmia, 240.

E.—Prof. R. GREEFF. Retina, 241; Optic nerve, 242; Injuries, foreign bodies, parasites, 244; Ocular disturbances in general affections, 247.

PAGE

13. Book Reviews and Notices. (Continued from page 123) . . . 250

XVIII.—An American Text-Book for Diseases of the Eye, Ear, Nose, and Throat. Edited by E. G. De Schweinitz and B. Alex. Randall.

XIX.—A Practical Handbook of the Muscular Anomalies of the Eye. By Howard F. Hansell and Wendel Reber.

XX.—A Treatise on Unripe Cataract. By Wm. A. M'Keown.

XXI.—Recherches anatomiques et cliniques sur le glaucome et les neoplasmes intraoculaires. By Prof. Panas and Dr. Rochon-Duvigneaud.

XXII.—Glaucoma; its Symptoms, Varieties, Pathology, and Treatment. By Alex. W. Stirling, M.D.

XXIII.—Communications from the Eye Clinique of the Carolinian Med.-Chir. Institute of Stockholm, (in German). By Prof. J. Widmark.

14. Miscellaneous Notes 257

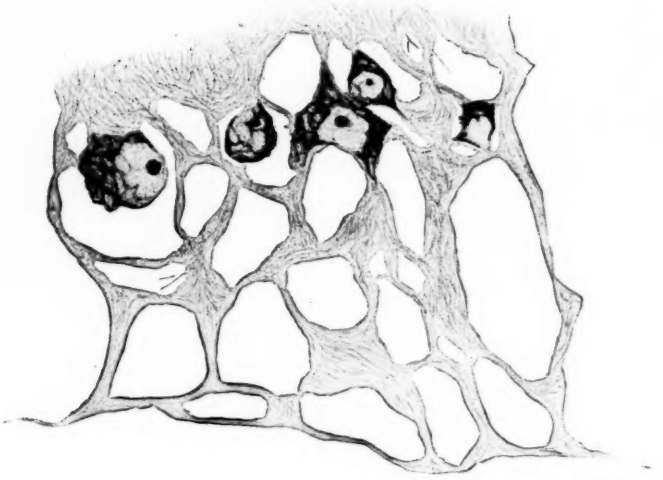
Society Meetings and Elections.

Appointments.

15. Obituary 257

16. Journal News 258

17. Contents of the Last Numbers of the *Archiv für Augenheilkunde* (German Edition of these ARCHIVES) 259



Bosse, del.

FIG. 1.—Ganglion-cell and nerve-fibre layers of retina, after hemorrhage.

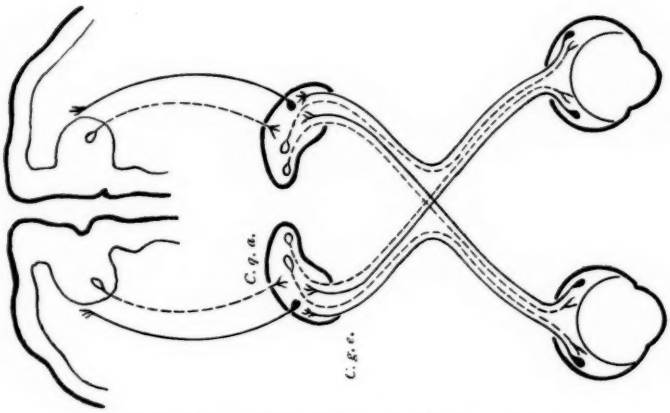


FIG. 2.—A diagram of the neurons of the visual tract.